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ANALYSIS DIRECTORY OF CANADIAN COMMERCIAL COALS - SUPPLEMENT NO. 5

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ANALYSIS DIRECTORY OF CANADIAN COMMERCIAL COALS - SUPPLEMENT NO. 5

by

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SUMMARY

The quality of Canadian commercial coals was assessed during 1982 by independently sampling mine run and prepared coals at operating mines, preparation plants and delivery points with the voluntary cooperation of the coal industry. The sampling was done by personnnel of the Coal Research Laboratories located at Sydney, Nova Scotia and Calgary, Alberta. Sample preparation and analyses were performed at the Energy Research Laboratories in Ottawa and Coal Research Laboratories in Sydney.

Generally, the samples represent production on a specific day, thus the results are broadly indicative, at least for comparative and screening purposes, of the quality of Canadian commercial coals produced at the time of sampling.

Coals are identified by operator (not necessarily the lease owner), name of mine, seam, coalfield and location. Information is arranged by province and is intended to provide a ready indication of the quality of commercially available coals and to complement coal industry statistics available in other federal and provincial reports. If a more continuous profile of the quality of a specific coal is needed for commercial purposes then the mine operator should, of course, be contacted.

All major coal mining operations in Canada were sampled.

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RÉPERTOIRE DES ANALYSES DES CHARBON COMMERCIAUS CANADIENS - SUPPLÉMENT N°. 5

par

G.W. Bonnell*, L.C. Janke** et A.S. Romaniuk***

SOMMAIRE

En 1982, la qualité des charbons commerciaux canadiens à été évaluée au moyen de l'étude indépendante d'échantillons de charbons tout-venants et de charbons préparés provenant de mines en exploitation, d'usines de préparation et de points de livraison. Les échantillons ont été prélevés par les laboratoires recherche sur le charbon à Sydney, en Nouvelle-Écosse, et à Calgary, en Alberta, et preparés et analysés par les employés de des laboratories de recherche sur l'énergie à Ottawa et des laboratoires de recherche sur le charbon à Sydney.

En général, les échantillons représentent la production d'une seule journée. Les résultats sont donc en grande partie indicatifs, du moins à des fins de comparaison et de criblage, de la qualité des charbons commerciaux canadiens produits au moment de l'échantillonage.

Les charbons sont identifiés par exploitant (qui n'est pas nécessairement le propriétaire de la concession), par mine, par filon, par bassin houiller et par lieu. les renseignements, organisés par province, ont pour objets d'offrir une indication immédiate de la qualité des charbons commerciaux disponibles et de compléter les statistiques sur l'industrie du charbon présentés dans d'autres rapports fédéraux et provinciaux. Pour obtenir des renseignements plus complets sur la qualité d'un charbon particulier à des fins commerciales, s'addresser à l'exploitant de la mine en question.

Toutes les grandes mines de charbon canadiennes ont été échantillonnées.

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INTRODUCTION

Complete chemical and physical analytical services are provided by CANMET for departmental and other coal projects, with files dating back to 1910. As well, CANMET (the former Mines Branch) has historically represented Canada's coal and coke quality assessment. As a result there is a steady demand within Canada and from abroad for data and information on the quality of Canadian coals. These enquiries come mostly from potential users of Canadian coals and from various government departments requiring commercial coal quality information for inventory and regulatory purposes.

To meet these needs a series of CANMET reports are published as supplements to the "Analysis Directory of Canadian Commerical Coals". These reports have been published at various intervals since the original issue in 1948 (1,2,3,4,5). This supplement covers analyses of coals sampled by CANMET staff in Nova Scotia, New Brunswick, Saskatchewan, Alberta and British Columbia in 1982. All major coal producing sites were sampled, although not all saleable products could be sampled.

Individual data sheets for each sample provide a selection of chemical and physical characteristics and identify the samples with regard to their relevant coalfields, seams and mining districts. This information provides a better understanding of variations in coal quality within and between coalfields. The selected format makes it possible to relate this information to the statistical data and summaries of coal industry developments which appear in various publications and in certain federal and provincial coal reports dealing with production statistics and resource and reserve assessment (7,8).

Future presentations of analytical data on commerical coal may involve further changes in format that will provide more information consistent with developing concepts and establishing a national coal inventory for Canada. As well, more specific sample location data will be incorporated in future reports.

Sample collection was conducted by staff of the regional laboratories of CANMET's Coal Research Laboratories in Sydney, Nova Scotia and Calgary, Alberta with the cooperation and assistance of mine operators and consumers. (Samples were taken by D.J. O'Brien, V. Srajer and H.G. Naidu.) Normal mining and preparation plant sampling procedures were followed so that analytical results would be reasonably representative of production at the time of sampling.

Sample preparation facilities of the New Brunswick Electric Power Commission were used for partial preparation of samples from the Minto coalfield in New Brunswick. Elsewhere, mobile and base facilities of the regional laboratories were used.

Sample preparation and analyses were conducted by qualified, experienced personnel at the Sydney and Ottawa laboratories using standard procedures of the American Society for Testing and Materials (ASTM). (Samples analyzed in Sydney were done by G.W. Bonnell, L.S. O'Leary and D.J. O'Brien. Samples analyzed at the Energy Research Laboratories in Ottawa were done by L.C. Janke, G. Anderson, J. Glasa, A. Martin, T. Psutka, D. Dion, B. Dureau, J. Skulski, M. Farrel, T.A. Lloyd, K. Graham and J. St. James).

Although sampling procedures and analytical results of individual samples must be accorded a high degree of confidence, the frequency and timing of sampling and selection of samples from a variety of sources - seams, conveyors, mine sites, preparation plants and delivery points - mean that the data may only be subjected to statistical analyses with some reservations. It must be understood that individual sample results are not necessarily typical or representative of production over long periods and certainly should not be related to specific contract specification requirements. It is hoped that the chemical and physical information will be useful for purposes such as: considering quality aspects of contract specifications, classifying coal by rank, considering environmental hazards, selecting combustion or conversion processes and, to a limited extent, evaluating coal suitability for metallurgical use. The specific data and their usefulness are discussed briefly below.

The proximate analysis includes mass per cent of moisture, ash, volatile matter and fixed carbon. For low-, medium-, and high-volatile A bituminous coals these determinations together with sulphur content and calorific value are presented on the basis of as-received moisture which is characteristically low. However, for high-volatile B and C bituminous, subbituminous and lignitic coals, the proximate analysis, sulphur content and calorific value are presented on the basis of equilibrium moisture content.

The as-received moisture is the total of the moisture loss determined on air drying under standard conditions (adherent or surface moisture) and the residual moisture determined as part of the proximate analysis (inherent or oven dried moisture). On the other hand, the equilibrium moisture provides a

means of estimating the natural bed moisture exclusive of surface moisture and is essential for classifying low-rank coals.

Data on proximate analysis, sulphur content and calorific value are essential for establishing contract specifications and prices and for quality control of coal deliveries. The moisture, ash, and sulphur contents and the calorific value are subject to improvement by appropriate coal preparation techniques used to upgrade the coal. The fixed carbon and volatile matter contents on a moisture, mineral-matter-free basis, along with the calorific value are essential for classifying coals by rank according to ASTM standards (Table 1).

The rank of the coal indicates the degree to which the original organic matter has been metamorphosed by temperature and pressure over time to form lignitic, subbituminous, bituminous or anthracitic coals. Rank is important commerically because, within wide limits, it signifies the potential use of the coal, subject to considerations related to quality factors such as moisture, ash, sulphur and trace element content.

The ultimate analysis presented on a dry basis includes mass per cent of carbon, hydrogen, sulphur, nitrogen, ash and oxygen, the latter obtained by difference from 100%. This elemental analysis is basic to the evaluation of coal for conversion and combustion uses.

The sulphur and trace element contents are important considerations related to power plant emissions and regional or national environmental pollution regulations. As well, sulphur is an unwanted constituent in the manufacture of coke for the metallurgical industry.

Sulphur forms reported in this publication are subdivided into three groups: pyritic sulphur, sulfate sulphur and organic sulphur. Sulphur forms are important considerations in coal washability and liquefaction.

Ash fusibility temperatures may be determined in a reducing or oxiding atmosphere and are considered when selecting combustion equipment to avoid or reduce clinkering and slagging problems.

The mineral content of ash is important in furnace design as well as in the design of electrostatic precipitators. Mineral analysis of coal ash together with ash fusibility temperatures allow the prediction of slag viscosity. Mineral analysis of coal ash can also be used to predict the nature of fireside deposits formed in the boiler and characteristics of the fly ash such as electrical resistivity.

The Hardgrove Grindability Index is an indicator of the energy required to grind a coal to the desired fineness; the lower the index the more energy required.

The ASTM Free Swelling Index (FSI) is an indicator of the swelling and caking characteristics of coal and is particularly relevant to selecting metallurgical coals.

The coal analyses are arranged by province. Each page contains a three-line heading stating where possible:

-name of mine operator (not necessarily the lease owner),

-name of mine, seam, and coalfield,

-mine location by place name, county or district as appropriate and province.

For coal mines in the plains of Saskatchewan and Alberta, locations are identified in the surveyed municipal land location system by section, township, range and meridian. Mines in Alberta are also identified by numbers assigned by Alberta's Energy Resources Conservation Board.

The approximate annual coal production of the major mines in Canada, in thousands of tonnes, is shown in Table 2 for 1982. Statistics are arranged by province, coalfield and company.

UNITS OF MEASUREMENT

Units of measurement in this report are in the International System of Units (SI) as approved for official use by the Canadian Standards Association and Metric Commission Canada. These units have been adopted by the Mining Association of Canada and the Coal Association of Canada. To assist with the shift to metric units these two associations have published "Metric Practice Guide for the Canadian Mining and Metallurgical Industries", 1978. Listed below are some useful conversion factors along with SI prefixes.

Multiply this		by this	to obtain	
British thermal unit	(Btu)	1055.06	joule	J
Btu per pound		2.326	kilojoule per kilogram	kJ/kg
cubic yard	cu yd	0.746 555	cubic metre	m^3
cubic yards per ton		0.842 78	cubic metres per tonne	m^3/t
degrees Celcius	°C	(°C x 9/5)+ 32	degrees Fahrenheit	°F
degrees Fahrenheit	°F	(°F - 32)x 5/9	degrees Celcius	°C
foot	ft	0.3048	metre	m
joule	J	0.000 947 8	Btu	
kilogram	kg	2.204 622 6	pound	lb
kilojoule per kilogram	kJ/kg	0.429 923	Btu per pound	
kilometre	km	0.621 371	mile	
litre per second	L/s	13.1982	gallon per minute	gpm
megajoule per kilogram	MJ/kg	429.923	Btu per pound	
metre	m	3.280 84	foot	ft
mile		1.609 344	kilometre	km
pound	lb	0.453 592 3	kilogram	kg
short ton per acre foot		7.354 67	tonne per hectare metre	t/ham
long ton		1.016 046 908 8	tonne	t
short ton		0.907 184 74	tonne	t
tonne	t	0.984 206 5	long ton	
tonne	t	1.102 311	short ton	

COAL ANALYSES - NOVA SCOTIA

EVANS COAL MINES LIMITED
Evans Mines; No. 5 Seam; Inverness Coalfield
St. Rose, Inverness County, Nova Scotia

Sampling date	1-12-82
Sampling location	Mine Dry Screening Plant
Product name	Medium Lump
Screen opening, mm	152 x 83, sq
(Screen opening, in)	6 x 3 1/4, sq
ERL number	2028-83

Rank of coal ..... High-volatile B bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	5.85		
Ash	%	8.22	8.73	
Volatile	%	34.26	36.39	39.87
Fixed carbon	%	51.67	54.88	60.13
Ultimate:				
Carbon	%	68.64	72.90	79.87
Hydrogen	%	4.21	4.47	4.90
Sulphur (Pyritic)	%	(2.88)	(3.06)	-
(Sulphate)	%	(0.13)	(0.14)	-
(Organic)	%	(3.17)	(3.37)	(3.69)
Total	%	6.18	6.57	-
Nitrogen	%	1.30	1.38	1.51
Ash	%	8.22	8.73	-
Oxygen, by difference	%	5.60	5.95	6.52
Heating value:				
	MJ/kg	28.55	30.22	33.22
	kcal/kg	6817	7241	7934
	Btu/lb	12,272	13,034	14,281

Hardgrove grindability index 54

Free swelling index (FSI) .. 4

Moisture (as rec'd)
- Inherent ..... %
- Adherent ..... %

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1049	
Spherical	°C	1063	
Hemispherical	°C	1074	
Fluid	°C	1163	

Notes:

EVANS COAL MINES LIMITED
Evans Mines; No. 5 Seam; Inverness Coalfield
St. Rose, Inverness County, Nova Scotia

Sampling date	1-12-82
Sampling location	Mine Dry Screening Plant
Product name	Medium Lump
Screen opening, mm	152 x 83, sq
(Screen opening, in)	6 x 3 1/4, sq
ERL number	2028-83
Ash analysis, %:	
SiO_2	25.71
Al_2O_3	9.87
Fe_2O_3	49.69
Mn_3O_4	-
TiO_2	0.51
P_2O_5	1.01
CaO	4.53
MgO	0.82
SO_3	5.31
Na_2O	1.61
K_2O	0.56
SrO	0.04
BaO	-
Loss on fusion (LOF)	0.53
Volatile trace element analysis µg/g (ppm)	
Hg	0.01
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

EVANS COAL MINES LIMITED
Evans Mines; No. 5 Seam; Inverness Coalfield
St. Rose, Inverness County, Nova Scotia

Sampling date		1-12-82	
Sampling location		Mine Dry Screening Plant	
Product name		Egg	
Screen opening, mm		83 x 51, sq	
(Screen opening, in)		3 1/4 x 2, sq	
ERL number		2029-83	
Rank of coal		High-volatile B bituminous	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	5.88		
Ash	%	9.73	10.34	
Volatile	%	33.44	35.53	39.63
Fixed carbon	%	50.95	54.13	60.37
Ultimate:				
Carbon	%	67.47	71.69	79.96
Hydrogen	%	4.13	4.39	4.90
Sulphur (Pyritic)	%	(2.72)	(2.89)	-
(Sulphate)	%	(0.15)	(0.16)	-
(Organic)	%	(3.03)	(3.22)	(3.59)
Total	%	5.90	6.27	-
Nitrogen	%	1.33	1.41	1.57
Ash	%	9.73	10.34	-
Oxygen, by difference	%	5.56	5.90	6.58
Heating value:				
	MJ/kg	27.98	29.73	33.16
	kcal/kg	6683	7100	7919
	Btu/lb	12,029	12,781	14,255
Hardgrove grindability index		55		
Free swelling index (FSI) ..		2 1/2		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1066		
Spherical	°C	1085		
Hemispherical	°C	1116		
Fluid	°C	1227		

Notes:

EVANS COAL MINES LIMITED
Evans Mines; No. 5 Seam; Inverness Coalfield
St. Rose, Inverness County, Nova Scotia

Sampling date	1-12-82
Sampling location	Mine Dry Screening Plant
Product name	Egg
Screen opening, mm	83 x 51, sq
(Screen opening, in)	3 1/4 x 2, sq
ERL number	2029-83
Ash analysis, %:	
SiO_2	30.94
Al_2O_3	12.65
Fe_2O_3	41.46
Mn_3O_4	-
TiO_2	0.58
P_2O_5	0.63
CaO	4.08
MgO	0.98
SO_3	5.26
Na_2O	1.58
K_2O	1.08
SrO	0.04
BaO	-
Loss on fusion (LOF)	0.03
Volatile trace element analysis µg/g (ppm)	
Hg	0.02
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

EVANS COAL MINES LIMITED
Evans Mines; No. 5 Seam; Inverness Coalfield
St. Rose, Inverness County, Nova Scotia

Sampling date		1-12-82		
Sampling location		Mine Dry Screening Plant		
Product name		Nut		
Screen opening, mm		51 x 19, sq		
(Screen opening, in)		2 x 3/4, sq		
ERL number		2030-83		
Rank of coal		High-volatile B bituminous		
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	5.88		
Ash	%	8.96	9.52	
Volatile	%	34.01	36.13	39.93
Fixed carbon	%	51.15	54.35	60.07
Ultimate:				
Carbon	%	67.06	71.25	78.75
Hydrogen	%	4.10	4.35	4.81
Sulphur (Pyritic)	%	(2.97)	(3.16)	-
(Sulphate)	%	(0.13)	(0.14)	-
(Organic)	%	(3.07)	(3.26)	(3.60)
Total	%	6.17	6.56	-
Nitrogen	%	1.26	1.34	1.48
Ash	%	8.96	9.52	-
Oxygen, by difference	%	6.57	6.98	7.71
Heating value:				
	MJ/kg	28.28	30.05	33.21
	kcal/kg	6756	7178	7933
	Btu/lb	12,160	12,920	14,279
Hardgrove grindability index		55		
Free swelling index (FSI) ..		3		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1052		
Spherical	°C	1068		
Hemispherical	°C	1077		
Fluid	°C	1177		

Notes:

EVANS COAL MINES LIMITED
Evans Mines; No. 5 Seam; Inverness Coalfield
St. Rose, Inverness County, Nova Scotia

Sampling date	1-12-82
Sampling location	Mine Dry Screening Plant
Product name	Nut
Screen opening, mm	51 x 19, sq
(Screen opening, in)	3 x 3/4, sq
ERL number	2030-83
Ash analysis, %:	
SiO_2	28.63
Al_2O_3	10.51
Fe_2O_3	48.47
Mn_3O_4	-
TiO_2	0.55
P_2O_5	0.59
CaO	3.09
MgO	0.53
SO_3	4.26
Na_2O	2.25
K_2O	0.76
SrO	-
BaO	-
Loss on fusion (LOF)	0.08
Volatile trace element analysis µg/g (ppm)	
Hg	0.02
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

EVANS COAL MINES LIMITED
Evans Mines; No. 5 Seam; Inverness Coalfield
St. Rose, Inverness County, Nova Scotia

Sampling date		1-12-82
Sampling location		Mine Dry Screening Plant
Product name		Stoker Pea
Screen opening, mm		19 x 6.4, sq
(Screen opening, in)		3/4 x 1/4, sq
ERL number		2031-83

Rank of coal ..... High-volatile B bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	6.00		
Ash	%	8.82	9.38	
Volatile	%	34.02	36.19	39.94
Fixed carbon	%	51.16	54.43	60.06
Ultimate:				
Carbon	%	66.12	70.34	77.62
Hydrogen	%	4.12	4.38	4.83
Sulphur (Pyritic)	%	(2.86)	(3.04)	-
(Sulphate)	%	(0.16)	(0.17)	-
(Organic)	%	(2.99)	(3.18)	(3.51)
Total	%	6.01	6.39	-
Nitrogen	%	1.21	1.29	1.42
Ash	%	8.82	9.38	-
Oxygen, by difference	%	7.72	8.22	9.07
Heating value:				
	MJ/kg	28.24	30.04	33.15
	kcal/kg	6744	7175	7918
	Btu/lb	12,140	12,915	14,252

Hardgrove grindability index		54
Free swelling index (FSI) ..		4
Moisture (as rec'd)		
Inherent	%	
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1052	
Spherical	°C	1068	
Hemispherical	°C	1093	
Fluid	°C	1207	

Notes:

EVANS COAL MINES LIMITED
Evans Mines; No. 5 Seam; Inverness Coalfield
St. Rose, Inverness County, Nova Scotia

Sampling date	1-12-82
Sampling location	Mine Dry Screening Plant
Product name	Stoker Pea
Screen opening, mm	19 x 6.4, sq
(Screen opening, in)	3/4 x 1/4, sq
ERL number	2031-83
Ash analysis, %:	
SiO_2	27.44
Al_2O_3	10.87
Fe_2O_3	47.18
Mn_3O_4	-
TiO_2	0.51
P_2O_5	0.56
CaO	3.41
MgO	0.89
SO_3	5.30
Na_2O	1.94
K_2O	0.94
SrO	-
BaO	-
Loss on fusion (LOF)	0.29
Volatile trace element analysis µg/g (ppm)	
Hg	0.02
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

EVANS COAL MINES LIMITED
Evans Mines; No. 5 Seam; Inverness Coalfield
St. Rose, Inverness County, Nova Scotia

Sampling date	1-12-82
Sampling location	Mine Dry Screening Plant
Product name	Fines
Screen opening, mm	Minus 6.4, sq
(Screen opening, in)	Minus 1/4, sq
ERL number	2032-83

Rank of coal ..... High-volatile B bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	5.86		
Ash	%	11.17	11.86	
Volatile	%	33.40	35.48	40.25
Fixed carbon	%	49.57	52.66	59.75
Ultimate:				
Carbon	%	65.92	70.02	79.44
Hydrogen	%	4.00	4.25	4.82
Sulphur (Pyritic)	%	(3.05)	(3.24)	-
(Sulphate)	%	(0.15)	(0.16)	-
(Organic)	%	(2.82)	(2.99)	(3.39)
Total	%	6.02	6.39	-
Nitrogen	%	1.21	1.29	1.46
Ash	%	11.17	11.86	-
Oxygen, by difference	%	5.82	6.19	7.02
Heating value:				
	MJ/kg	27.48	29.19	33.12
	kcal/kg	6564	6973	7911
	Btu/lb	11,816	12,551	14,240

Hardgrove grindability index		56
Free swelling index (FSI) ..		3
Moisture (as rec'd)		
Inherent	%	
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1052	
Spherical	°C	1077	
Hemispherical	°C	1093	
Fluid	°C	1157	

Notes:

EVANS COAL MINES LIMITED
Evans Mines; No. 5 Seam; Inverness Coalfield
St. Rose, Inverness County, Nova Scotia

Sampling date	1-12-82
Sampling location	Mine Dry Screening Plant
Product name	Fines
Screen opening, mm	Minus 6.4, sq
(Screen opening, in)	Minus 1/4, sq
ERL number	2032-83
Ash analysis, %:	
SiO_2	28.30
Al_2O_3	12.45
Fe_2O_3	37.88
Mn_3O_4	-
TiO_2	0.49
P_2O_5	0.41
CaO	5.68
MgO	1.67
SO_3	8.59
Na_2O	2.01
K_2O	1.44
SrO	-
BaO	-
Loss on fusion (LOF)	0.55
Volatile trace element analysis µg/g (ppm)	
Hg	0.04
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

DRUMMOND COAL COMPANY LIMITED
Drummond Colliery; No. 1 (Scott Pit) Seam; Pictou Coalfield
Westville, Pictou County, Nova Scotia

Sampling date	4-11-82
Sampling location	Mine
Product name	Mine Run
Screen opening, mm	
(Screen opening, in)	
ERL number	4671-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.19		
Ash	%	25.29	25.59	
Volatile	%	23.63	23.91	32.13
Fixed carbon	%	49.89	50.50	67.87
Ultimate:				
Carbon	%	61.05	61.79	83.04
Hydrogen	%	3.54	3.58	4.81
Sulphur (Pyritic)	%	(2.63)	(2.66)	-
(Sulphate)	%	(0.01)	(0.01)	-
(Organic)	%	(0.77)	(0.78)	(1.05)
Total	%	3.41	3.45	-
Nitrogen	%	1.46	1.48	1.99
Ash	%	25.29	25.59	-
Oxygen, by difference	%	4.06	4.11	5.52
Heating value:				
	MJ/kg	25.49	25.79	34.66
	kcal/kg	6087	6160	8278
	Btu/lb	10,957	11,089	14,903

Hardgrove grindability index	56	
Free swelling index (FSI) ..	1 1/2	
Moisture (as rec'd)		
Inherent ..... %	1.19	
Adherent ..... %	-	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1204	1379
Spherical	°C	1338	1418
Hemispherical	°C	1352	1441
Fluid	°C	1421	1454

Notes:

DRUMMOND COAL COMPANY LIMITED
Drummond Colliery; No. 1 (Scott Pit) Seam; Pictou Coalfield
Westville, Pictou County, Nova Scotia

Sampling date	4-11-82
Sampling location	Mine
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4671-82
Ash analysis, %:	
SiO_2	51.06
Al_2O_3	24.52
Fe_2O_3	14.38
Mn_3O_4	-
TiO_2	0.70
P_2O_5	0.37
CaO	2.30
MgO	1.19
SO_3	2.85
Na_2O	0.60
K_2O	1.95
SrO	0.04
BaO	-
Loss on fusion (LOF)	0.69
Volatile trace element analysis µg/g (ppm)	
Hg	0.05
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
Lingan Mine; Harbour Seam; Sydney Coalfield
Lingan, Cape Breton County, Nova Scotia

Sampling date	14-10-82
Sampling location	(Gantry) Section A
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4674-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.59		
Ash	%	9.87	10.03	
Volatile	%	35.39	35.96	39.97
Fixed carbon	%	53.15	54.01	60.03
Ultimate:				
Carbon	%	73.87	75.06	83.43
Hydrogen	%	4.82	4.90	5.45
Sulphur (Pyritic)	%	(2.04)	(2.07)	-
(Sulphate)	%	(0.01)	(0.01)	-
(Organic)	%	(0.64)	(0.65)	(0.72)
Total	%	2.69	2.73	-
Nitrogen	%	2.10	2.13	2.37
Ash	%	9.87	10.03	-
Oxygen, by difference	%	5.06	5.15	5.72
Heating value:				
	MJ/kg	30.70	31.20	34.68
	kcal/kg	7333	7451	8282
	Btu/lb	13,199	13,413	14,908

Hardgrove grindability index		54
Free swelling index (FSI) ..		7
Moisture (as rec'd)		
Inherent	%	1.59
Adherent	%	-

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1096	1357
Spherical	°C	1113	1418
Hemispherical	°C	1238	1413
Fluid	°C	1304	1429

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Lingan Mine; Harbour Seam; Sydney Coalfield
Lingan, Cape Breton County, Nova Scotia

Sampling date	14-10-82
Sampling location	(Gantry) Section A
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4674-82
Ash analysis, %:	
SiO_2	31.25
Al_2O_3	15.58
Fe_2O_3	42.68
Mn_3O_4	-
TiO_2	0.59
P_2O_5	0.02
CaO	2.58
MgO	0.96
SO_3	3.55
Na_2O	0.45
K_2O	1.42
SrO	-
BaO	-
Loss on fusion (LOF)	0.58
Volatile trace element analysis µg/g (ppm)	
Hg	0.18
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
Lingan Mine; Harbour Seam; Sydney Coalfield
Lingan, Cape Breton County, Nova Scotia

Sampling date	15-10-82
Sampling location	Mine (Silo)
Product name	Coarse Slack
Screen opening, mm	Minus 75, sq
(Screen opening, in)	Minus 3, sq
ERL number	4675-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	6.71		
Ash	%	17.27	18.51	
Volatile	%	29.13	31.23	38.32
Fixed carbon	%	46.89	50.26	61.68
Ultimate:				
Carbon	%	63.34	67.90	83.32
Hydrogen	%	4.10	4.40	5.40
Sulphur (Pyritic)	%	(1.08)	(1.16)	-
(Sulphate)	%	(0.00)	(0.00)	-
(Organic)	%	(0.31)	(0.33)	(0.40)
Total	%	1.39	1.49	-
Nitrogen	%	1.41	1.51	1.85
Ash	%	17.27	18.51	-
Oxygen, by difference	%	5.78	6.19	7.60
Heating value:				
	MJ/kg	26.76	28.69	35.21
	kcal/kg	6932	6852	8408
	Btu/lb	11,506	12,334	15,136

Hardgrove grindability index		56
Free swelling index (FSI) ..		7
Moisture (as rec'd)		
Inherent	%	1.09
Adherent	%	5.62

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1234	1382
Spherical	°C	1327	1418
Hemispherical	°C	1335	1443
Fluid	°C	1413	1482+

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Lingan Mine; Harbour Seam; Sydney Coalfield
Lingan, Cape Breton County, Nova Scotia

Sampling date	15-10-82
Sampling location	Mine (Silo)
Product name	Coarse Slack
Screen opening, mm	Minus 75, sq
(Screen opening, in)	Minus 3, sq
ERL number	4675-82

Ash analysis, %:

SiO_2	51.61
Al_2O_3	24.90
Fe_2O_3	12.99
Mn_3O_4	-
TiO_2	0.95
P_2O_5	-
CaO	1.10
MgO	1.35
SO_3	1.46
Na_2O	0.82
K_2O	3.88
SrO	0.02
BaO	-
Loss on fusion (LOF)	0.36

Volatile trace element analysis µg/g (ppm)

Hg	0.07
Cl	
F	
Br	
As	
Se	

Non-volatile trace element analysis µg/g (ppm)

Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
Lingan Mine; Harbour Seam; Sydney Coalfield
Lingan, Cape Breton County, Nova Scotia

Sampling date	9-12-82
Sampling location	Wash Plant, Sydney Mines
Product name	Screen Coal (oiled)
Screen opening, mm	Plus 19, rd
(Screen opening, in)	Plus 3/4, rd
ERL number	2038-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	3.72		
Ash	%	5.93	6.16	
Volatile	%	36.14	37.54	40.00
Fixed carbon	%	54.21	56.30	60.00
Ultimate:				
Carbon	%	75.74	78.67	83.83
Hydrogen	%	4.83	5.02	5.35
Sulphur (Pyritic)	%	(2.08)	(2.16)	-
(Sulphate)	%	(0.00)	(0.00)	-
(Organic)	%	(0.90)	(0.93)	(0.99)
Total	%	2.98	3.09	-
Nitrogen	%	1.73	1.80	1.92
Ash	%	5.93	6.16	-
Oxygen, by difference	%	5.07	5.26	5.61
Heating value:				
	MJ/kg	31.80	33.03	35.20
	kcal/kg	7596	7890	8408
	Btu/lb	13,673	14,201	15,133

Hardgrove grindability index		54
Free swelling index (FSI) ..		7
Moisture (as rec'd)		
Inherent	%	1.87
Adherent	%	1.85

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1060	
Spherical	°C	1077	
Hemispherical	°C	1085	
Fluid	°C	1293	

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Lingan Mine; Harbour Seam; Sydney Coalfield
Lingan, Cape Breton County, Nova Scotia

Sampling date	9-12-82
Sampling location	Wash Plant, Sydney Mines
Product name	Screen Coal (Oiled)
Screen opening, mm	Plus 19, rd
(Screen opening, in)	Plus 3/4, rd
ERL number	2038-83
Ash analysis, %:	
SiO_2	27.48
Al_2O_3	11.89
Fe_2O_3	49.84
Mn_3O_4	-
TiO_2	0.68
P_2O_5	0.03
CaO	3.29
MgO	0.52
SO_3	4.19
Na_2O	0.58
K_2O	0.53
SrO	-
BaO	-
Loss on fusion (LOF)	0.15
Volatile trace element analysis µg/g (ppm)	
Hg	0.36
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
Lingan Mine; Harbour Seam; Sydney Coalfield
Lingan, Cape Breton County, Nova Scotia

Sampling date	9-12-82
Sampling location	Wash Plant, Sydney Mines
Product name	Pea and Fines
Screen opening, mm	Minus 19, rd
(Screen opening, in)	Minus 3/4, rd
ERL number	2039-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	7.06		
Ash	%	10.23	11.01	
Volatile	%	32.71	35.19	35.54
Fixed carbon	%	50.00	53.80	60.46
Ultimate:				
Carbon	%	69.58	74.87	84.13
Hydrogen	%	4.41	4.74	5.33
Sulphur (Pyritic)	%	(2.02)	(2.17)	-
(Sulphate)	%	(0.02)	(0.02)	-
(Organic)	%	(0.86)	(0.93)	(1.05)
Total	%	2.90	3.12	-
Nitrogen	%	1.58	1.70	1.91
Ash	%	10.23	11.01	-
Oxygen, by difference	%	4.24	4.56	5.12
Heating value:				
	MJ/kg	28.80	30.99	34.82
	kcal/kg	6879	7402	8318
	Btu/lb	12,382	13,323	14,971

Hardgrove grindability index		58	
Free swelling index (FSI) ..		6 1/2	
Moisture (as rec'd)			
Inherent	%	2.02	
Adherent	%	5.04	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1074	
Spherical	°C	1149	
Hemispherical	°C	1207	
Fluid	°C	1257	

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Lingan Mine; Harbour Seam; Sydney Coalfield
Lingan, Cape Breton County, Nova Scotia

Sampling date	9-12-82
Sampling location	Wash Plant, Sydney Mines
Product name	Pea and Fines
Screen opening, mm	Minus 19, rd
(Screen opening, in)	Minus 3/4, rd
ERL number	2039-83
Ash analysis, %:	
SiO_2	39.22
Al_2O_3	16.70
Fe_2O_3	31.01
Mn_3O_4	-
TiO_2	0.67
P_2O_5	0.11
CaO	3.48
MgO	0.78
SO_3	4.46
Na_2O	0.51
K_2O	2.04
SrO	0.02
BaO	-
Loss on fusion (LOF)	0.10
Volatile trace element analysis µg/g (ppm)	
Hg	0.17
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
Lingan Mine; Harbour Seam; Sydney Coalfield
Lingan, Cape Breton County, Nova Scotia

Sampling date	16-12-82
Sampling location	Coal Preparation Plant Victoria Junction
Product name	Coarse Feed
Screen opening, mm	38 x 24 mesh, sq
(Screen opening, in)	1 1/2 x 24 mesh, sq
ERL number	2047-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	11.99		
Ash	%	18.26	20.75	
Volatile	%	27.97	31.78	40.10
Fixed carbon	%	41.78	47.47	59.90
Ultimate:				
Carbon	%	59.39	67.48	85.15
Hydrogen	%	3.79	4.31	5.44
Sulphur (Pyritic)	%	(1.28)	(1.45)	-
(Sulphate)	%	(0.00)	(0.00)	-
(Organic)	%	(0.27)	(0.31)	(0.39)
Total	%	1.55	1.76	-
Nitrogen	%	1.46	1.66	2.09
Ash	%	18.26	20.75	-
Oxygen, by difference	%	3.56	4.04	5.10
Heating value:				
	MJ/kg	24.54	27.88	35.18
	kcal/kg	5860	6658	8401
	Btu/lb	10,547	11,984	15,122

Hardgrove grindability index		57
Free swelling index (FSI) ..		7
Moisture (as rec'd)		
Inherent	%	0.93
Adherent	%	11.06

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1216	
Spherical	°C	1332	
Hemispherical	°C	1385	
Fluid	°C	1416	

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Lingan Mine; Harbour Seam; Sydney Coalfield
Lingan, Cape Breton County, Nova Scotia

Sampling date	16-12-82
Sampling location	Coal Preparation Plant Victoria Junction
Product name	Coarse Feed
Screen opening, mm	38 x 24 mesh, sq
(Screen opening, in)	1 1/2 x 24 mesh, sq
ERL number	2047-83
Ash analysis, %:	
SiO_2	52.98
Al_2O_3	24.77
Fe_2O_3	13.97
Mn_3O_4	-
TiO_2	0.99
P_2O_5	0.03
CaO	0.58
MgO	1.24
SO_3	0.79
Na_2O	0.64
K_2O	3.64
SrO	-
BaO	-
Loss on fusion (LOF)	0.05
Volatile trace element analysis µg/g (ppm)	
Hg	0.10
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
Lingan Mine; Harbour Seam; Sydney Coalfield
Lingan, Cape Breton County, Nova Scotia

Sampling date		16-12-82
Sampling location		Coal Preparation Plant Victoria Junction
Product name		Raw Feed
Screen opening, mm		Minus 38, sq
(Screen opening, in)		Minus 1 1/2, sq
ERL number		2048-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	9.25		
Ash	%	22.53	24.83	
Volatile	%	27.82	30.65	40.77
Fixed carbon	%	40.40	44.52	59.23
Ultimate:				
Carbon	%	59.18	65.21	86.75
Hydrogen	%	3.87	4.26	5.67
Sulphur (Pyritic)	%	(1.75)	(1.93)	-
(Sulphate)	%	(0.00)	(0.00)	-
(Organic)	%	(0.25)	(0.27)	(0.36)
Total	%	2.00	2.20	-
Nitrogen	%	1.29	1.42	1.89
Ash	%	22.53	24.83	-
Oxygen, by difference	%	1.88	2.08	2.77
Heating value:				
	MJ/kg	23.86	26.29	34.97
	kcal/kg	5699	6280	8354
	Btu/lb	10,258	11,304	15,038

Hardgrove grindability index		57
Free swelling index (FSI) ..		6
Moisture (as rec'd)		
Inherent	%	0.92
Adherent	%	8.33

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1243	
Spherical	°C	1335	
Hemispherical	°C	1424	
Fluid	°C	1454	

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Lingan Mine; Harbour Seam; Sydney Coalfield
Lingan, Cape Breton County, Nova Scotia

Sampling date	16-12-82
Sampling location	Coal Preparation Plant Victoria Junction
Product name	Raw Feed
Screen opening, mm	Minus 38, sq
(Screen opening, in)	Minus 1 1/2, sq
ERL number	2048-83
Ash analysis, %:	
SiO_2	52.05
Al_2O_3	25.12
Fe_2O_3	13.69
Mn_3O_4	-
TiO_2	0.95
P_2O_5	0.02
CaO	0.75
MgO	1.30
SO_3	0.93
Na_2O	0.74
K_2O	3.93
SrO	0.01
BaO	-
Loss on fusion (LOF)	0.30
Volatile trace element analysis µg/g (ppm)	
Hg	0.23
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
No. 26 Colliery; Harbour Seam; Sydney Coalfield
Glace Bay, Cape Breton County, Nova Scotia

Sampling date			14-12-82	
Sampling location			Mine	
Product name			Mine run	
Screen opening, mm				
(Screen opening, in)				
ERL number			2042-83	
Rank of coal			High-volatile A bituminous	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	5.28		
Ash	%	6.81	7.19	
Volatile	%	31.43	33.18	35.75
Fixed carbon	%	56.48	59.63	64.25
Ultimate:				
Carbon	%	76.11	80.35	86.57
Hydrogen	%	4.57	4.83	5.20
Sulphur (Pyritic)	%	(0.64)	(0.68)	-
(Sulphate)	%	(0.00)	(0.00)	-
(Organic)	%	(0.59)	(0.62)	(0.67)
Total	%	1.23	1.30	-
Nitrogen	%	1.69	1.78	1.92
Ash	%	6.81	7.19	-
Oxygen, by difference	%	4.31	4.55	4.90
Heating value:				
	MJ/kg	31.50	33.26	35.84
	kcal/kg	7524	7943	8558
	Btu/lb	13,542	14,297	15,405
Hardgrove grindability index		72		
Free swelling index (FSI) ..		7		
Moisture (as rec'd)				
Inherent	%	0.79		
Adherent	%	4.49		
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1085		
Spherical	°C	1104		
Hemispherical	°C	1163		
Fluid	°C	1266		

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
No. 26 Colliery; Harbour Seam; Sydney Coalfield
Glace Bay, Cape Breton County, Nova Scotia

Sampling date	14-12-82
Sampling location	Mine
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	2042-83

Ash analysis, %:

SiO_2	33.12
Al_2O_3	15.87
Fe_2O_3	36.47
Mn_3O_4	-
TiO_2	0.78
P_2O_5	0.51
CaO	3.25
MgO	1.86
SO_3	4.04
Na_2O	0.75
K_2O	1.54
SrO	0.01
BaO	-
Loss on fusion (LOF)	0.47

Volatile trace element analysis µg/g (ppm)

Hg	0.19
Cl	
F	
Br	
As	
Se	

Non-volatile trace element analysis µg/g (ppm)

Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
No. 26 Colliery; Harbour Seam; Sydney Coalfield
Cape Breton County, Nova Scotia

Sampling date	16-12-82
Sampling location	Coal Preparation Plant Victoria Junction
Product name	Coarse Feed
Screen opening, mm	38 x 24 mesh, sq
(Screen opening, in)	1 1/2 x 24 mesh, sq
ERL number	2045-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	9.06		
Ash	%	16.52	18.17	
Volatile	%	28.26	31.07	37.97
Fixed carbon	%	46.16	50.76	62.03
Ultimate:				
Carbon	%	66.02	72.60	88.72
Hydrogen	%	4.20	4.62	5.65
Sulphur (Pyritic)	%	(0.90)	(0.99)	-
(Sulphate)	%	(0.01)	(0.01)	-
(Organic)	%	(0.37)	(0.41)	(0.50)
Total	%	1.28	1.41	-
Nitrogen	%	1.55	1.70	2.08
Ash	%	16.52	18.17	-
Oxygen, by difference	%	1.37	1.50	1.83
Heating value:				
	MJ/kg	26.43	29.06	35.51
	kcal/kg	6313	6942	8483
	Btu/lb	11,363	12,495	15,269

Hardgrove grindability index		65	
Free swelling index (FSI) ..		6	
Moisture (as rec'd)			
Inherent	%	0.67	
Adherent	%	8.39	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1221	
Spherical	°C	1324	
Hemispherical	°C	1379	
Fluid	°C	1404	

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
No. 26 Colliery; Harbour Seam; Sydney Coalfield
Cape Breton County, Nova Scotia

Sampling date	16-12-82
Sampling location	Coal Preparation Plant Victoria Junction
Product name	Coarse Feed
Screen opening, mm	38 x 24 mesh, sq
(Screen opening, in)	1 1/2 x 24 mesh, sq
ERL number	2045-83
Ash analysis, %:	
SiO_2	56.75
Al_2O_3	20.60
Fe_2O_3	13.39
Mn_3O_4	-
TiO_2	0.82
P_2O_5	0.09
CaO	0.77
MgO	1.24
SO_3	0.81
Na_2O	0.59
K_2O	3.06
SrO	0.01
BaO	-
Loss on fusion (LOF)	0.20
Volatile trace element analysis µg/g (ppm)	
Hg	0.14
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
No. 26 Colliery; Harbour Seam; Sydney Coalfield
Cape Breton County, Nova Scotia

Sampling date		16-12-82		
Sampling location		Coal Preparation Plant Victoria Junction		
Product name		Raw Feed		
Screen opening, mm		Minus 38, sq		
(Screen opening, in)		Minus 1 1/2, sq		
ERL number		2045-83		
Rank of coal		High-volatile A bituminous		
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	5.51		
Ash	%	13.56	14.35	
Volatile	%	30.69	32.48	37.92
Fixed carbon	%	50.24	53.17	62.08
Ultimate:				
Carbon	%	70.64	74.76	87.29
Hydrogen	%	4.37	4.63	5.41
Sulphur (Pyritic)	%	(1.22)	(1.29)	-
(Sulphate)	%	(0.00)	(0.00)	-
(Organic)	%	(0.19)	(0.20)	(0.23)
Total	%	1.41	1.49	-
Nitrogen	%	1.56	1.65	1.93
Ash	%	13.56	14.35	-
Oxygen, by difference	%	2.95	3.12	3.64
Heating value:				
	MJ/kg	29.01	30.70	35.84
	kcal/kg	6928	7332	8560
	Btu/lb	12,470	13,197	15,408
Hardgrove grindability index		64		
Free swelling index (FSI) ..		7		
Moisture (as rec'd)				
Inherent	%	0.75		
Adherent	%	4.76		
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1143		
Spherical	°C	1260		
Hemispherical	°C	1321		
Fluid	°C	1338		

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
No. 26 Colliery; Harbour Seam; Sydney Coalfield
Cape Breton County, Nova Scotia

Sampling date	16-12-82
Sampling location	Coal Preparation Plant Victoria Junction
Product name	Raw Feed
Screen opening, mm	Minus 38, sq
(Screen opening, in)	Minus 1 1/2, sq
ERL number	2046-83
Ash analysis, %:	
SiO_2	48.80
Al_2O_3	21.85
Fe_2O_3	16.78
Mn_3O_4	-
TiO_2	0.99
P_2O_5	0.10
CaO	2.75
MgO	1.65
SO_3	3.44
Na_2O	0.69
K_2O	2.97
SrO	0.01
BaO	-
Loss on fusion (LOF)	0.21
Volatile trace element analysis µg/g (ppm)	
Hg	0.14
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
Lingan/No. 26 Mine; Harbour Seam; Sydney Coalfield
Cape Breton County, Nova Scotia

Sampling date		12-10-82
Sampling location		Seaboard Power Station (NSPC)
Product name		Slack
Screen opening, mm		Minus 38, sq
(Screen opening, in)		Minus 1 1/2, sq
ERL number		4676-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	6.17		
Ash	%	6.17	6.58	
Volatile	%	33.11	32.29	37.78
Fixed carbon	%	54.55	58.13	62.22
Ultimate:				
Carbon	%	73.81	78.66	84.20
Hydrogen	%	4.74	5.05	5.41
Sulphur (Pyritic)	%	(1.58)	(1.68)	-
(Sulphate)	%	(0.07)	(0.07)	-
(Organic)	%	(0.64)	(0.69)	(0.74)
Total	%	2.29	2.44	-
Nitrogen	%	1.44	1.53	1.64
Ash	%	6.17	6.58	-
Oxygen, by difference	%	5.38	5.74	6.14
Heating value:				
	MJ/kg	31.26	33.32	35.67
	kcal/kg	7468	7959	8520
	Btu/lb	13,442	14,326	15,335

Hardgrove grindability index		60
Free swelling index (FSI) ..		7 1/2
Moisture (as rec'd)		
Inherent	%	1.12
Adherent	%	5.05

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1085	1366
Spherical	°C	1199	1396
Hemispherical	°C	1282	1399
Fluid	°C	1332	1413

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Lingan/No. 26 Mine; Harbour Seam; Sydney Coalfield
Cape Breton County, Nova Scotia

Sampling date	12-10-82
Sampling location	Seaboard Power Station (NSPC)
Product name	Slack
Screen opening, mm	Minus 38, sq
(Screen opening, in)	Minus 1 1/2, sq
ERL number	4676-82
Ash analysis, %:	
SiO_2	32.65
Al_2O_3	17.93
Fe_2O_3	42.02
Mn_3O_4	-
TiO_2	0.91
P_2O_5	0.17
CaO	1.59
MgO	0.96
SO_3	2.00
Na_2O	0.42
K_2O	1.43
SrO	0.01
BaO	-
Loss on fusion (LOF)	0.58
Volatile trace element analysis µg/g (ppm)	
Hg	0.15
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
Lingan/No. 26 Mine; Harbour Seam; Sydney Coalfield
Cape Breton County, Nova Scotia

Sampling date	16-12-82
Sampling location	Coal Preparation Plant Victoria Junction
Product name	Metallurgical Coal
Screen opening, mm	Minus 38, sq
(Screen opening, in)	Minus 1 1/2, sq
ERL number	2043-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	5.64		
Ash	%	1.98	2.10	
Volatile	%	34.66	36.73	37.52
Fixed carbon	%	57.72	61.17	62.48
Ultimate:				
Carbon	%	79.58	84.33	86.14
Hydrogen	%	4.97	5.27	5.38
Sulphur (Pyritic)	%	(0.30)	(0.32)	-
(Sulphate)	%	(0.00)	(0.00)	-
(Organic)	%	(0.71)	(0.75)	(0.77)
Total	%	1.01	1.07	-
Nitrogen	%	1.97	2.09	2.13
Ash	%	1.98	2.10	-
Oxygen, by difference	%	4.85	5.14	5.25
Heating value:				
	MJ/kg	33.44	35.44	36.20
	kcal/kg	7987	8464	8646
	Btu/lb	14,376	15,235	15,562

Hardgrove grindability index		63	
Free swelling index (FSI) ..		8	
Moisture (as rec'd)			
Inherent	%	0.81	
Adherent	%	4.83	
Ash fusibility temperature:		**Reducing**	**Oxidizing**
Initial	°C	1093	
Spherical	°C	1199	
Hemispherical	°C	1310	
Fluid	°C	1393	

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Lingan/No. 26 Mine; Harbour Seam; Sydney Coalfield
Cape Breton County, Nova Scotia

Sampling date	16-12-82
Sampling location	Coal Preparation Plant Victoria Junction
Product name	Metallurgical Coal
Screen opening, mm	Minus 38, sq
(Screen opening, in)	Minus 1 1/2, sq
ERL number	2043-83
Ash analysis, %:	
SiO_2	29.15
Al_2O_3	19.09
Fe_2O_3	42.97
Mn_3O_4	-
TiO_2	0.94
P_2O_5	0.25
CaO	1.64
MgO	0.94
SO_3	1.22
Na_2O	0.89
K_2O	0.85
SrO	-
BaO	-
Loss on fusion (LOF)	1.40
Volatile trace element analysis µg/g (ppm)	
Hg	0.44
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
Lingan/No. 26 Mine; Harbour Seam; Sydney Coalfield
Cape Breton County, Nova Scotia

Sampling date	16-12-82
Sampling location	Coal Preparation Plant Victoria Junction
Product name	Thermal Coal
Screen opening, mm	Minus 38, sq
(Screen opening, in)	Minus 1 1/2, sq
ERL number	2044-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	4.46		
Ash	%	8.75	9.16	
Volatile	%	34.18	35.78	39.39
Fixed carbon	%	52.61	55.06	60.61
Ultimate:				
Carbon	%	73.92	77.37	85.17
Hydrogen	%	4.65	4.87	5.36
Sulphur (Pyritic)	%	(2.82)	(2.95)	-
(Sulphate)	%	(0.01)	(0.01)	-
(Organic)	%	(0.55)	(0.58)	(0.64)
Total	%	3.38	3.54	-
Nitrogen	%	1.74	1.82	2.00
Ash	%	8.75	9.16	-
Oxygen, by difference	%	3.10	3.24	3.57
Heating value:				
	MJ/kg	30.81	32.25	35.50
	kcal/kg	7359	7703	8480
	Btu/lb	13,247	13,865	15,263

Hardgrove grindability index		59
Free swelling index (FSI) ..		7
Moisture (as rec'd)		
Inherent	%	0.76
Adherent	%	3.70

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1068	
Spherical	°C	1149	
Hemispherical	°C	1241	
Fluid	°C	1279	

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Lingan/No. 26 Mine; Harbour Seam; Sydney Coalfield
Cape Breton County, Nova Scotia

Sampling date	16-12-82
Sampling location	Coal Preparation Plant Victoria Junction
Product name	Thermal Coal
Screen opening, mm	Minus 38, sq
(Screen opening, in)	Minus 1 1/2, sq
ERL number	2044-83
Ash analysis, %:	
SiO_2	33.36
Al_2O_3	16.20
Fe_2O_3	44.22
Mn_3O_4	-
TiO_2	0.96
P_2O_5	0.27
CaO	0.95
MgO	0.55
SO_3	1.00
Na_2O	0.33
K_2O	0.92
SrO	0.01
BaO	-
Loss on fusion (LOF)	0.22
Volatile trace element analysis µg/g (ppm)	
Hg	0.31
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
Lingan/No. 26 Mine; Harbour Seam; Sydney Coalfield
Cape Breton County, Nova Scotia

Sampling date	16-12-82
Sampling location	Coal Preparation Plant Victoria Junction
Product name	Fines Product
Screen opening, mm (Screen opening, in)	Minus 24, mesh
ERL number	2049-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	23.42		
Ash	%	3.98	5.20	
Volatile	%	26.54	34.66	36.56
Fixed carbon	%	46.06	60.14	63.44
Ultimate:				
Carbon	%	62.66	81.83	86.32
Hydrogen	%	3.83	5.00	5.27
Sulphur (Pyritic)	%	(0.78)	(1.02)	-
(Sulphate)	%	(0.00)	(0.00)	-
(Organic)	%	(0.51)	(0.66)	(0.70)
Total	%	1.29	1.68	-
Nitrogen	%	1.48	1.93	2.04
Ash	%	3.98	5.20	-
Oxygen, by difference	%	3.34	4.36	4.60
Heating value:				
	MJ/kg	26.06	34.03	35.90
	kcal/kg	6224	8128	8574
	Btu/lb	11,204	14,630	15,432

Hardgrove grindability index

Free swelling index (FSI) .. 7 1/2

Moisture (as rec'd)

Inherent	%	0.79
Adherent	%	22.63

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1068	
Spherical	°C	1132	
Hemispherical	°C	1279	
Fluid	°C	1346	

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Lingan/No. 26 Mine; Harbour Seam; Sydney Coalfield
Cape Breton County, Nova Scotia

Sampling date	16-12-82
Sampling location	Coal Preparation Plant Victoria Junction
Product name	Fines Product
Screen opening, mm (Screen opening, in)	Minus 24 mesh
ERL number	2049-83
Ash analysis, %:	
SiO_2	31.75
Al_2O_3	17.35
Fe_2O_3	35.40
Mn_3O_4	-
TiO_2	0.79
P_2O_5	0.12
CaO	3.86
MgO	1.28
SO_3	5.07
Na_2O	1.23
K_2O	1.76
SrO	-
BaO	-
Loss on fusion (LOF)	0.22
Volatile trace element analysis µg/g (ppm)	
Hg	0.14
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
Lingan/No. 26 Mine; Harbour Seam; Sydney Coalfield
Cape Breton County, Nova Scotia

Sampling date		16-12-82
Sampling location		Coal Preparation Plant Victoria Junction
Product name		Coarse Reject
Screen opening, mm		38 x 24 mesh, sq
(Screen opening, in)		1 1/2 x 24 mesh, sq
ERL number		2050-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	5.51		
Ash	%	81.28	86.02	
Volatile	%	8.70	9.21	65.88
Fixed carbon	%	4.51	4.77	34.12
Ultimate:				
Carbon	%	6.31	6.68	47.78
Hydrogen	%	0.67	0.71	5.08
Sulphur (Pyritic)	%	(1.83)	(1.94)	-
(Sulphate)	%	(0.00)	(0.00)	-
(Organic)	%	(0.05)	(0.05)	(0.36)
Total	%	1.88	1.99	-
Nitrogen	%	0.35	0.37	2.65
Ash	%	81.28	86.02	-
Oxygen, by difference	%	4.00	4.23	30.26
Heating value:				
	MJ/kg	1.80	1.91	13.66
	kcal/kg	430	455	3255
	Btu/lb	774	819	5858

Hardgrove grindability index

Free swelling index (FSI) .. NA

Moisture (as rec'd)

Inherent	%	0.66
Adherent	%	4.85

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1263	
Spherical	°C	1368	
Hemispherical	°C	1399	
Fluid	°C	1477	

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Lingan/No. 26 Mine; Harbour Seam; Sydney Coalfield
Cape Breton County, Nova Scotia

Sampling date	16-12-82
Sampling location	Coal Preparation Plant Victoria Junction
Product name	Coarse Reject
Screen opening, mm	38 x 24 mesh, sq
(Screen opening, in)	1 1/2 x 24 mesh, sq
ERL number	2050-83
Ash analysis, %:	
SiO_2	57.15
Al_2O_3	23.95
Fe_2O_3	9.01
Mn_3O_4	-
TiO_2	0.98
P_2O_5	0.01
CaO	0.56
MgO	1.61
SO_3	0.80
Na_2O	0.68
K_2O	3.72
SrO	0.01
BaO	-
Loss on fusion (LOF)	-
Volatile trace element analysis µg/g (ppm)	
Hg	0.26
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
Lingan/No. 26 Mine; Harbour Seam; Sydney Coalfield
Cape Breton County, Nova Scotia

Sampling date		16-12-82
Sampling location		Coal Preparation Plant Victoria Junction
Product name		Fines Reject
Screen opening, mm (Screen opening, in)		Minus 24 mesh
ERL number		2051-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	0.76		
Ash	%	67.27	67.79	
Volatile	%	20.61	20.77	64.48
Fixed carbon	%	11.36	11.44	35.52
Ultimate:				
Carbon	%	25.24	25.43	78.95
Hydrogen	%	1.53	1.54	4.78
Sulphur (Pyritic)	%	(1.32)	(1.33)	-
(Sulphate)	%	(0.03)	(0.03)	-
(Organic)	%	(0.13)	(0.13)	(0.40)
Total	%	1.48	1.49	-
Nitrogen	%	0.62	0.62	1.92
Ash	%	67.27	67.79	-
Oxygen, by difference	%	3.10	3.13	9.72
Heating value:				
	MJ/kg	9.32	9.39	29.15
	kcal/kg	2226	2243	6964
	Btu/lb	4007	4037	12,533

Hardgrove grindability index

Free swelling index (FSI) .. 1/2

Moisture (as rec'd)

Inherent	%	0.76
Adherent	%	2.27

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1135	
Spherical	°C	1207	
Hemispherical	°C	1221	
Fluid	°C	1302	

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Lingan/No. 26 Mine; Harbour Seam; Sydney Coalfield
Cape Breton County, Nova Scotia

Sampling date	16-12-82
Sampling location	Coal Preparation Plant Victoria Junction
Product name	Fines Reject
Screen opening, mm (Screen opening, in)	Minus 24 mesh
ERL number	2051-83
Ash analysis, %:	
SiO_2	41.19
Al_2O_3	19.20
Fe_2O_3	18.14
Mn_3O_4	-
TiO_2	0.73
P_2O_5	-
CaO	9.36
MgO	1.24
SO_3	5.76
Na_2O	0.50
K_2O	2.94
SrO	0.01
BaO	-
Loss on fusion (LOF)	0.56
Volatile trace element analysis µg/g (ppm)	
Hg	0.10
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
Prince Mine; Hub Seam; Sydney Coalfield
Point Aconi, Cape Breton County, Nova Scotia

Sampling date		4-11-82		
Sampling location		Trenton Power Plant (NSPC)		
Product name		Slack		
Screen opening, mm		Minus 38, sq		
(Screen opening, in)		Minus 1 1/2, sq		
ERL number		4672-82		
Rank of coal		High-volatile A bituminous		
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	10.17		
Ash	%	16.53	18.40	
Volatile	%	28.57	31.80	38.97
Fixed carbon	%	44.73	49.80	61.03
Ultimate:				
Carbon	%	59.98	66.77	81.83
Hydrogen	%	3.92	4.36	5.34
Sulphur (Pyritic)	%	(2.70)	(3.01)	-
(Sulphate)	%	(0.37)	(0.41)	-
(Organic)	%	(1.57)	(1.75)	(2.14)
Total	%	4.64	5.17	-
Nitrogen	%	1.27	1.41	1.73
Ash	%	16.53	18.40	-
Oxygen, by difference	%	3.49	3.89	4.77
Heating value:				
	MJ/kg	23.48	27.14	33.26
	kcal/kg	5823	6482	7944
	Btu/lb	10,480	11,667	14,298
Hardgrove grindability index		60		
Free swelling index (FSI) ..		4 1/2		
Moisture (as rec'd)				
Inherent	%	3.45		
Adherent	%	6.72		
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1093		1368
Spherical	°C	1104		1393
Hemispherical	°C	1177		1402
Fluid	°C	1318		1404

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Prince Mine; Hub Seam; Sydney Coalfield
Point Aconi, Cape Breton County, Nova Scotia

Sampling date	3-11-82
Sampling location	Trenton Power Plant (NSPC)
Product name	Slack
Screen opening, mm	Minus 24, sq
(Screen opening, in)	Minus 1 1/2, sq
ERL number	4672-82
Ash analysis, %:	
SiO_2	39.37
Al_2O_3	20.42
Fe_2O_3	29.12
Mn_3O_4	-
TiO_2	0.74
P_2O_5	0.11
CaO	1.77
MgO	0.94
SO_3	2.37
Na_2O	0.50
K_2O	2.29
SrO	0.01
BaO	-
Loss on fusion (LOF)	0.60
Volatile trace element analysis µg/g (ppm)	
Hg	0.16
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
Prince Mine; Hub Seam; Sydney Coalfield
Point Aconi, Cape Breton County, Nova Scotia

Sampling date		13-10-82		
Sampling location		Lingan Power Station (NSPC)		
Product name		Mine Run		
Screen opening, mm				
(Screen opening, in)				
ERL number		4673-82		
Rank of coal		High-volatile A bituminous		
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	7.11		
Ash	%	14.66	15.78	
Volatile	%	31.38	33.78	40.11
Fixed carbon	%	46.85	50.44	59.89
Ultimate:				
Carbon	%	62.50	67.28	79.89
Hydrogen	%	4.16	4.48	5.32
Sulphur (Pyritic)	%	(3.47)	(3.74)	-
(Sulphate)	%	(0.26)	(0.28)	-
(Organic)	%	(1.69)	(1.82)	(2.16)
Total	%	5.42	5.84	-
Nitrogen	%	1.24	1.34	1.59
Ash	%	14.66	15.78	-
Oxygen, by difference	%	4.91	5.28	6.27
Heating value:				
	MJ/kg	26.33	28.34	33.65
	kcal/kg	6288	6769	8037
	Btu/lb	11,317	12,183	14,466
Hardgrove grindability index		57		
Free swelling index (FSI) ..		4		
Moisture (as rec'd)				
Inherent	%	3.41		
Adherent	%	3.70		
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1102		1393
Spherical	°C	1174		1413
Hemispherical	°C	1291		1416
Fluid	°C	1363		1429

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Prince Mine; Hub Seam; Sydney Coalfield
Point Aconi, Cape Breton County, Nova Scotia

Sampling date	13-10-82
Sampling location	Lingan Power Station (NSPC)
Product name	Mine Run
Screen opening, mm	
(Screen opening, in)	
ERL number	4673-82

Ash analysis, %:

SiO_2	31.80
Al_2O_3	18.01
Fe_2O_3	42.19
Mn_3O_4	-
TiO_2	0.60
P_2O_5	0.01
CaO	1.36
MgO	0.96
SO_3	1.92
Na_2O	0.31
K_2O	2.25
SrO	-
BaO	-
Loss on fusion (LOF)	-

Volatile trace element analysis µg/g (ppm)

Hg	0.16
Cl	
F	
Br	
As	
Se	

Non-volatile trace element analysis µg/g (ppm)

Ba
Sr
V
Mn
Cr

Notes:

CAPE BRETON DEVELOPMENNT CORPORATION (CBDC)
Prince Mine; Hub Seam; Sydney Coalfield
Point Aconi, Cape Breton County, Nova Scotia

Sampling date	3-12-82
Sampling location	Mine
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	2034-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	10.46		
Ash	%	26.21	29.27	
Volatile	%	25.11	28.04	39.64
Fixed carbon	%	38.22	42.69	60.36
Ultimate:				
Carbon	%	50.29	56.16	79.40
Hydrogen	%	3.28	3.66	5.17
Sulphur (Pyritic)	%	(2.97)	(3.32)	-
(Sulphate)	%	(0.17)	(0.19)	-
(Organic)	%	(0.73)	(0.81)	(1.15)
Total	%	3.87	4.32	-
Nitrogen	%	1.07	1.20	1.70
Ash	%	26.21	29.27	-
Oxygen, by difference	%	4.82	5.39	7.62
Heating value:				
	MJ/kg	20.80	23.23	32.84
	kcal/kg	4969	5549	7845
	Btu/lb	8,942	9,987	14,120

Hardgrove grindability index		60
Free swelling index (FSI) ..		4
Moisture (as rec'd)		
Inherent	%	3.13
Adherent	%	7.33

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1160	
Spherical	°C	1316	
Hemispherical	°C	1346	
Fluid	°C	1382	

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Prince Mine; Hub Seam; Sydney Coalfield
Point Aconi, Cape Breton County, Nova Scotia

Sampling date	3-12-82
Sampling location	Mine
Product name	Mine Run
Screen opening, mm	
(Screen opening, in)	
ERL number	2034-83

Ash analysis, %:

SiO_2	49.62
Al_2O_3	23.14
Fe_2O_3	16.65
Mn_3O_4	-
TiO_2	0.87
P_2O_5	0.66
CaO	2.22
MgO	0.84
SO_3	2.43
Na_2O	0.49
K_2O	1.89
SrO	0.12
BaO	-
Loss on fusion (LOF)	-

Volatile trace element analysis µg/g (ppm)

Hg	0.17
Cl	
F	
Br	
As	
Se	

Non-volatile trace element analysis µg/g (ppm)

Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
Prince Mine; Hub Seam; Sydney Coalfield
Point Aconi, Cape Breton County, Nova Scotia

Sampling date		9-12-82
Sampling location		Wash Plant, Sydney Mines
Product name		Screen Coal (oiled)
Screen opening, mm		Plus 19, rd
(Screen opening, in)		Plus 3/4, rd
ERL number		2036-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	4.41		
Ash	%	8.89	9.30	
Volatile	%	35.22	36.84	40.62
Fixed carbon	%	51.48	53.86	59.38
Ultimate:				
Carbon	%	70.99	74.27	81.89
Hydrogen	%	4.64	4.85	5.35
Sulphur (Pyritic)	%	(2.95)	(3.09)	-
(Sulphate)	%	(0.06)	(0.06)	-
(Organic)	%	(1.11)	(1.16)	(1.28)
Total	%	4.12	4.31	-
Nitrogen	%	1.41	1.47	1.62
Ash	%	8.89	9.30	-
Oxygen, by difference	%	5.54	5.80	6.39
Heating value:				
	MJ/kg	29.53	30.89	34.06
	kcal/kg	7052	7377	8133
	Btu/lb	12,692	13,278	14,639

Hardgrove grindability index		55
Free swelling index (FSI) ..		5 1/2
Moisture (as rec'd)		
Inherent	%	2.98
Adherent	%	1.43

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1093	
Spherical	°C	1213	
Hemispherical	°C	1327	
Fluid	°C	1407	

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Prince Mine; Hub Seam; Sydney Coalfield
Point Aconi, Cape Breton County, Nova Scotia

Sampling date	9-12-82
Sampling location	Wash Plant, Sydney Mines
Product name	Screen Coal (Oiled)
Screen opening, mm	Plus 19, rd
(Screen opening, in)	Plus 3/4, rd
ERL number	2036-83
Ash analysis, %:	
SiO_2	28.38
Al_2O_3	18.78
Fe_2O_3	45.85
Mn_3O_4	-
TiO_2	0.65
P_2O_5	0.20
CaO	1.13
MgO	0.68
SO_3	1.28
Na_2O	0.63
K_2O	1.41
SrO	0.03
BaO	-
Loss on fusion (LOF)	0.14
Volatile trace element analysis µg/g (ppm)	
Hg	0.11
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CAPE BRETON DEVELOPMENMT CORPORATION (CBDC)
Prince Mine; Hub Seam; Sydney Coalfield
Point Aconi, Cape Breton County, Nova Scotia

Sampling date	9-12-82
Sampling location	Wash Plant, Sydney Mines
Product name	Pea and Fines
Screen opening, mm	Minus 19, rd
(Screen opening, in)	Minus 3/4, rd
ERL number	2037-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	7.08		
Ash	%	15.13	16.28	
Volatile	%	31.32	33.71	40.27
Fixed carbon	%	46.47	50.01	59.73
Ultimate:				
Carbon	%	62.42	67.18	80.24
Hydrogen	%	4.04	4.35	5.20
Sulphur (Pyritic)	%	(3.26)	(3.51)	-
(Sulphate)	%	(0.04)	(0.04)	-
(Organic)	%	(1.03)	(1.11)	(1.33)
Total	%	4.33	4.66	-
Nitrogen	%	1.31	1.41	1.68
Ash	%	15.13	16.28	-
Oxygen, by difference	%	5.69	6.12	7.31
Heating value:				
	MJ/kg	26.43	28.44	33.97
	kcal/kg	6311	6792	8113
	Btu/lb	11,360	12,226	14,603

Hardgrove grindability index		58
Free swelling index (FSI) ..		5
Moisture (as rec'd)		
Inherent	%	2.31
Adherent	%	4.77

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1110	
Spherical	°C	1213	
Hemispherical	°C	1307	
Fluid	°C	1341	

Notes:

CAPE BRETON DEVELOPMENT CORPORATION (CBDC)
Prince Mine; Hub Seam; Sydney Coalfield
Point Aconi, Cape Breton County, Nova Scotia

Sampling date	9-12-82
Sampling location	Wash Plant, Sydney Mines
Product name	Pea and Fines
Screen opening, mm	Minus 19, rd
(Screen opening, in)	Minus 3/4, rd
ERL number	2037-83
Ash analysis, %:	
SiO_2	39.53
Al_2O_3	21.16
Fe_2O_3	30.76
Mn_3O_4	-
TiO_2	0.82
P_2O_5	0.18
CaO	1.32
MgO	0.78
SO_3	1.41
Na_2O	0.58
K_2O	2.20
SrO	0.04
BaO	-
Loss on fusion (LOF)	-
Volatile trace element analysis µg/g (ppm)	
Hg	0.12
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

THOMAS BROGAN AND SONS CONSTRUCTION LIMITED
Brogans Mine (strip); Lower Bonar Seam (Lloyd Cove); Sydney Coalfield
Point Aconi, Cape Breton County, Nova Scotia

Sampling date		3-12-82
Sampling location		Mine
Product name		Mine Run
Screen opening, mm		
(Screen opening, in)		
ERL number		2035-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	10.12		
Ash	%	7.66	8.52	
Volatile	%	30.81	34.28	37.47
Fixed carbon	%	51.41	57.20	62.53
Ultimate:				
Carbon	%	65.59	72.98	79.78
Hydrogen	%	4.11	4.57	5.00
Sulphur (Pyritic)	%	(3.81)	(4.24)	-
(Sulphate)	%	(0.19)	(0.21)	-
(Organic)	%	(1.37)	(1.53)	(1.67)
Total	%	5.37	5.98	-
Nitrogen	%	1.33	1.48	1.62
Ash	%	7.66	8.52	-
Oxygen, by difference	%	5.82	6.47	7.07
Heating value:				
	MJ/kg	27.49	30.58	33.43
	kcal/kg	6564	7303	7983
	Btu/lb	11,816	13,146	14,370

Hardgrove grindability index		52	
Free swelling index (FSI) ..		3 1/2	
Moisture (as rec'd)			
Inherent	%	5.73	
Adherent	%	4.39	
Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1149	
Spherical	°C	1160	
Hemispherical	°C	1199	
Fluid	°C	1241	

Notes:

THOMAS BROGAN AND SONS CONSTRUCTION LIMITED
Brogans Mine (strip); Lower Bonar Seam (Lloyd Cove); Sydney Coalfield
Point Aconi, Cape Breton County, Nova Scotia

Sampling date	3-12-82
Sampling location	Mine
Product name	Mine Run
Screen opening, mm	
(Screen opening, in)	
ERL number	2035-83
Ash analysis, %:	
SiO_2	14.20
Al_2O_3	7.99
Fe_2O_3	75.96
Mn_3O_4	-
TiO_2	0.25
P_2O_5	0.03
CaO	0.89
MgO	0.51
SO_3	1.08
Na_2O	0.14
K_2O	0.39
SrO	-
BaO	-
Loss on fusion (LOF)	0.02
Volatile trace element analysis µg/g (ppm)	
Hg	0.10
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

SELMINCO INC
Coal Reclamation Project; Princess Dump; Sydney Coalfield
Sydney Mines, Cape Breton County, Nova Scotia

Sampling date	9-12-82
Sampling location	Stockpile
Product name	Slack
Screen opening, mm	38 x 28 mesh, sq
(Screen opening, in)	1 1/2 x 28 mesh, sq
ERL number	2040-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	5.76		
Ash	%	7.19	7.63	
Volatile	%	33.91	35.98	38.95
Fixed carbon	%	53.14	56.39	61.05
Ultimate:				
Carbon	%	74.02	78.54	85.03
Hydrogen	%	4.67	4.96	5.37
Sulphur (Pyritic)	%	(1.58)	(1.68)	-
(Sulphate)	%	(0.02)	(0.02)	-
(Organic)	%	(1.09)	(1.15)	(1.24)
Total	%	2.69	2.85	-
Nitrogen	%	1.63	1.73	1.87
Ash	%	7.19	7.63	-
Oxygen, by difference	%	4.04	4.29	4.64
Heating value:				
	MJ/kg	30.83	32.71	35.41
	kcal/kg	7362	7812	8457
	Btu/lb	13,252	14,062	15,224

Hardgrove grindability index		59
Free swelling index (FSI) ..		7
Moisture (as rec'd)		
Inherent	%	1.09
Adherent	%	4.67

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1085	
Spherical	°C	1157	
Hemispherical	°C	1241	
Fluid	°C	1299	

Notes:

SELMIGCO INC
Coal Reclamation Project; Princess Dump; Sydney Coalfield
Sydney Mines, Cape Breton County, Nova Scotia

Sampling date	9-12-82
Sampling location	Stockpile
Product name	Slack
Screen opening, mm	38 x 28 mesh, sq
(Screen opening, in)	1 1/2 x 28 mesh, sq
EML number	2040-83
Ash analysis, %:	
SiO_2	35.10
Al_2O_3	17.94
Fe_2O_3	39.81
Mn_3O_4	-
TiO_2	0.96
P_2O_5	0.16
CaO	0.96
MgO	0.55
SO_3	1.06
Na_2O	0.38
K_2O	1.50
SrO	0.01
BaO	-
Loss on fusion (LOF)	0.13
Volatile trace element analysis µg/g (ppm)	
Hg	0.28
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

SELMINCO INC
Coal Reclamation Project; Lingan Dump; Sydney Coalfield
New Waterford, Cape Breton County, Nova Scotia

Sampling date	14-12-82
Sampling location	Stockpile
Product name	Slack
Screen opening, mm	38 x 28 mesh, sq
(Screen opening, in)	1 1/2 x 28 mesh, sq
ERL number	2041-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	6.95		
Ash	%	4.44	4.77	
Volatile	%	31.82	34.20	35.91
Fixed carbon	%	56.79	61.03	64.09
Ultimate:				
Carbon	%	75.51	81.15	85.21
Hydrogen	%	4.74	5.09	5.34
Sulphur (Pyritic)	%	(0.48)	(0.52)	-
(Sulphate)	%	(0.05)	(0.05)	-
(Organic)	%	(0.80)	(0.86)	(0.90)
Total	%	1.33	1.43	-
Nitrogen	%	1.77	1.90	2.00
Ash	%	4.44	4.77	-
Oxygen, by difference	%	5.26	5.66	5.94
Heating value:				
	MJ/kg	30.99	33.30	34.97
	kcal/kg	7400	7953	8351
	Btu/lb	13,321	14,316	15,033

Hardgrove grindability index	62	
Free swelling index (FSI) ..	7 1/2	
Moisture (as rec'd)		
Inherent	%	1.80
Adherent	%	5.15

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1118	
Spherical	°C	1238	
Hemispherical	°C	1313	
Fluid	°C	1332	

Notes:

SELMINCO INC
Coal Reclamation Project; Lingan Dump; Sydney Coalfield
New Waterford, Cape Breton County, Nova Scotia

Sampling date	14-12-82
Sampling location	Stockpile
Product name	Slack
Screen opening, mm	38 x 28 mesh, sq
(Screen opening, in)	1 1/2 x 28 mesh, sq
ERL number	2041-83
Ash analysis, %:	
SiO_2	41.58
Al_2O_3	21.40
Fe_2O_3	25.87
Mn_3O_4	-
TiO_2	1.05
P_2O_5	0.50
CaO	1.94
MgO	0.85
SO_3	2.36
Na_2O	0.70
K_2O	2.16
SrO	0.06
BaO	-
Loss on fusion (LOF)	0.45
Volatile trace element analysis µg/g (ppm)	
Hg	0.10
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

NOVACO LIMITED
Sydney Main Seam (Harbour); Sydney Coalfield
Point Aconi, Cape Breton County, Nova Scotia

Sampling date	3-12-82
Sampling location	Mine Site
Product name	Slack
Screen opening, mm	Minus 51, rd
(Screen opening, in)	Minus 2, rd
ERL number	2033-83

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	5.88		
Ash	%	11.65	12.38	
Volatile	%	36.44	38.72	44.19
Fixed carbon	%	46.03	48.90	55.81
Ultimate:				
Carbon	%	67.27	71.47	81.57
Hydrogen	%	4.55	4.83	5.51
Sulphur (Pyritic)	%	(4.75)	(5.05)	-
(Sulphate)	%	(0.08)	(0.09)	-
(Organic)	%	(0.85)	(0.90)	(1.03)
Total	%	5.68	6.04	-
Nitrogen	%	1.33	1.41	1.61
Ash	%	11.65	12.38	-
Oxygen, by difference	%	3.64	3.87	4.42
Heating value:				
	MJ/kg	28.21	29.97	34.20
	kcal/kg	6737	7158	8169
	Btu/lb	12,126	12,884	14,704

Hardgrove grindability index		52
Free swelling index (FSI) ..		4
Moisture (as rec'd)		
Inherent	%	3.09
Adherent	%	2.79

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1102	
Spherical	°C	1135	
Hemispherical	°C	1210	
Fluid	°C	1316	

Notes:

NOVACO LIMITED
Sydney Main Seam (Harbour); Sydney Coalfield
Point Aconi, Cape Breton County, Nova Scotia

Sampling date	3-12-82
Sampling location	Mine Site
Product name	Slack
Screen opening, mm	Minus 51, rd
(Screen opening, in)	Minus 2, rd
ERL number	2033-83
Ash analysis, %:	
SiO_2	23.05
Al_2O_3	14.31
Fe_2O_3	55.72
Mn_3O_4	-
TiO_2	0.51
P_2O_5	0.13
CaO	1.59
MgO	0.55
SO_3	1.47
Na_2O	0.25
K_2O	1.37
SrO	-
BaO	-
Loss on fusion (LOF)	0.06
Volatile trace element analysis µg/g (ppm)	
Hg	0.30
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

COAL ANALYSES - NEW BRUNSWICK

N.B. COAL LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	27-10-82
Sampling location	Dragline 9W
Product name	Seam Sample
Screen opening, mm (Screen opening, in)	
ERL number	4656-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	0.87		
Ash	%	23.13	23.33	
Volatile	%	31.34	31.62	41.24
Fixed carbon	%	44.66	45.05	58.76
Ultimate:				
Carbon	%	61.35	61.89	80.72
Hydrogen	%	3.89	3.92	5.11
Sulphur (Pyritic)	%	(10.32)	(10.41)	-
(Sulphate)	%	(0.12)	(0.12)	-
(Organic)	%	(1.61)	(1.63)	(2.13)
Total	%	12.05	12.16	-
Nitrogen	%	0.83	0.84	1.10
Ash	%	23.13	23.33	-
Oxygen, by difference	%	0.00	0.00	0.00
Heating value:				
	MJ/kg	26.28	26.51	34.58
	kcal/kg	6277	6332	8259
	Btu/lb	11,299	11,398	14,866

Hardgrove grindability index	56	
Free swelling index (FSI) ..	5	
Moisture (as rec'd)		
Inherent	%	0.87
Adherent	%	-

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1024	1393
Spherical	°C	1049	1438
Hemispherical	°C	1054	1449
Fluid	°C	1099	1449

Notes:

N.B. COAL LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	27-10-82
Sampling location	Dragline 9w
Product name	Seam Sample
Screen opening, mm (Screen opening, in)	
ERL number	4656-82
Ash analysis, %:	
SiO_2	22.55
Al_2O_3	7.97
Fe_2O_3	59.77
Mn_3O_4	-
TiO_2	0.40
P_2O_5	1.37
CaO	3.82
MgO	0.29
SO_3	4.22
Na_2O	0.08
K_2O	0.70
SrO	-
BaO	-
Loss on fusion (LOF)	0.68
Volatile trace element analysis µg/g (ppm)	
Hg	0.86
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

N.B. COAL LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	27-10-82
Sampling location	Grand Lake Power Station (NBEPC) Dragline 9w
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4657-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	0.92		
Ash	%	22.80	23.01	
Volatile	%	31.34	31.63	41.08
Fixed carbon	%	44.94	45.36	58.92
Ultimate:				
Carbon	%	59.28	59.83	77.71
Hydrogen	%	3.82	3.86	5.01
Sulphur (Pyritic)	%	(9.65)	(9.74)	-
(Sulphate)	%	(0.13)	(0.13)	-
(Organic)	%	(1.42)	(1.43)	(1.86)
Total	%	11.20	11.30	-
Nitrogen	%	1.23	1.24	1.61
Ash	%	22.80	23.01	-
Oxygen, by difference	%	0.75	0.76	0.99
Heating value:				
	MJ/kg	26.33	26.58	34.52
	kcal/kg	6289	6347	8244
	Btu/lb	11,320	11,425	14,840

Hardgrove grindability index		59
Free swelling index (FSI) ..		5
Moisture (as rec'd)		
Inherent	%	0.92
Adherent	%	-

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1066	1399
Spherical	°C	1068	1429
Hemispherical	°C	1091	1435
Fluid	°C	1121	1446

Notes:

N.B. COAL LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	27-10-82
Sampling location	Grand Lake Power Station (NBEPC) Dragline 9w
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4657-82
Ash analysis, %:	
SiO_2	24.47
Al_2O_3	8.73
Fe_2O_3	55.79
Mn_3O_4	-
TiO_2	0.41
P_2O_5	1.35
CaO	3.99
MgO	0.53
SO_3	4.40
Na_2O	0.08
K_2O	0.85
SrO	-
BaO	-
Loss on fusion (LOF)	0.41
Volatile trace element analysis µg/g (ppm)	
Hg	1.23
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

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Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	28-10-82
Sampling location	Dragline 500
Product name	Seam Sample
Screen opening, mm (Screen opening, in)	
ERL number	4658-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	0.81		
Ash	%	21.00	21.17	
Volatile	%	30.55	30.80	39.07
Fixed carbon	%	47.64	48.03	60.93
Ultimate:				
Carbon	%	65.37	65.90	83.60
Hydrogen	%	4.15	4.18	5.30
Sulphur (Pyritic)	%	(5.82)	(5.87)	-
(Sulphate)	%	(0.07)	(0.07)	-
(Organic)	%	(1.40)	(1.41)	(1.79)
Total	%	7.29	7.35	-
Nitrogen	%	1.10	1.11	1.41
Ash	%	21.00	21.17	-
Oxygen, by difference	%	0.28	0.29	0.37
Heating value:				
	MJ/kg	27.49	27.71	35.15
	kcal/kg	6565	6619	8397
	Btu/lb	11,817	11,914	15,114

Hardgrove grindability index		56
Free swelling index (FSI) ..		4 1/2
Moisture (as rec'd)		
Inherent	%	0.81
Adherent	%	-

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1082	1443
Spherical	°C	1110	1454
Hemispherical	°C	1118	1455
Fluid	°C	1168	1456

Notes:

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Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	28-10-82
Sampling location	Dragline 500
Product name	Seam Sample
Screen opening, mm (Screen opening, in)	
ERL number	4658-82
Ash analysis, %:	
SiO_2	24.02
Al_2O_3	9.39
Fe_2O_3	59.84
Mn_3O_4	-
TiO_2	0.46
P_2O_5	0.79
CaO	1.87
MgO	0.88
SO_3	2.16
Na_2O	0.10
K_2O	1.38
SrO	-
BaO	-
Loss on fusion (LOF)	0.47
Volatile trace element analysis µg/g (ppm)	
Hg	0.42
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

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Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	27-10-82
Sampling location	Grand Lake Power Station (NBEPC) Dragline 500
Product name	Mine Run
Screen opening, mm	
(Screen opening, in)	
ERL number	4659-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	0.85		
Ash	%	22.42	22.61	
Volatile	%	30.89	31.15	40.25
Fixed carbon	%	45.84	46.24	59.75
Ultimate:				
Carbon	%	61.45	61.98	80.09
Hydrogen	%	3.96	3.99	5.16
Sulphur (Pyritic)	%	(10.04)	(10.13)	-
(Sulphate)	%	(0.18)	(0.18)	-
(Organic)	%	(1.38)	(1.39)	(1.80)
Total	%	11.60	11.70	-
Nitrogen	%	0.83	0.84	1.09
Ash	%	22.42	22.61	-
Oxygen, by difference	%	0.00	0.00	0.00
Heating value:				
	MJ/kg	26.72	26.95	34.82
	kcal/kg	6381	6436	8316
	Btu/lb	11,486	11,584	14,968

Hardgrove grindability index	60	
Free swelling index (FSI) ..	6	
Moisture (as rec'd)		
Inherent ..... %	0.85	
Adherent ..... %	-	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1035	1321
Spherical	°C	1071	1363
Hemispherical	°C	1138	1374
Fluid	°C	1232	1388

Notes:

N.B. COAL LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	27-10-82
Sampling location	Grand Lake Power Station (NBEPC) Dragline 500
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4659-82
Ash analysis, %:	
SiO_2	24.46
Al_2O_3	8.73
Fe_2O_3	55.79
Mn_3O_4	-
TiO_2	0.41
P_2O_5	1.35
CaO	3.99
MgO	0.53
SO_3	4.40
Na_2O	0.07
K_2O	1.85
SrO	-
BaO	-
Loss on fusion (LOF)	0.40
Volatile trace element analysis µg/g (ppm)	
Hg	0.86
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

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Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	27-10-82
Sampling location	Dragline 7200
Product name	Seam Sample
Screen opening, mm	
(Screen opening, in)	
ERL number	4660-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.23		
Ash	%	26.29	26.62	
Volatile	%	30.96	31.35	42.72
Fixed carbon	%	41.52	42.03	57.28
Ultimate:				
Carbon	%	56.58	57.28	78.06
Hydrogen	%	3.61	3.65	4.97
Sulphur (Pyritic)	%	(11.96)	(12.11)	-
(Sulphate)	%	(0.36)	(0.36)	-
(Organic)	%	(1.38)	(1.40)	(1.91)
Total	%	13.70	13.87	-
Nitrogen	%	1.05	1.06	1.44
Ash	%	26.29	26.62	-
Oxygen, by difference	%	0.00	0.00	0.00
Heating value:				
	MJ/kg	24.85	25.16	34.29
	kcal/kg	5935	6009	8189
	Btu/lb	10,683	10,816	14,740

Hardgrove grindability index	55	
Free swelling index (FSI) ..	5 1/2	
Moisture (as rec'd)		
Inherent ..... %	1.23	
Adherent ..... %	-	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1029	1413
Spherical	°C	1057	1435
Hemispherical	°C	1068	1443
Fluid	°C	1135	1454

Notes:

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Sampling date	27-10-82
Sampling location	Dragline 7200
Product name	Seam Sample
Screen opening, mm (Screen opening, in)	
ERL number	4660-82
Ash analysis, %:	
SiO_2	38.12
Al_2O_3	13.79
Fe_2O_3	35.24
Mn_3O_4	-
TiO_2	0.71
P_2O_5	3.12
CaO	4.76
MgO	0.66
SO_3	2.28
Na_2O	-
K_2O	0.89
SrO	-
BaO	-
Loss on fusion (LOF)	1.43
Volatile trace element analysis µg/g (ppm)	
Hg	1.23
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

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Sampling date	27-10-82
Sampling location	Grand Lake Power Station (NBEPC) Dragline 7200
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4661-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.31		
Ash	%	22.52	22.82	
Volatile	%	31.59	32.01	41.47
Fixed carbon	%	44.58	45.17	58.53
Ultimate:				
Carbon	%	60.32	61.12	79.19
Hydrogen	%	3.87	3.92	5.08
Sulphur (Pyritic)	%	(9.31)	(9.43)	-
(Sulphate)	%	(0.34)	(0.35)	-
(Organic)	%	(1.35)	(1.37)	(1.78)
Total	%	11.00	11.15	-
Nitrogen	%	0.97	0.98	1.27
Ash	%	22.52	22.82	-
Oxygen, by difference	%	0.01	0.01	0.01
Heating value:				
	MJ/kg	26.48	26.83	34.76
	kcal/kg	6324	6408	8303
	Btu/lb	11,383	11,534	14,944

Hardgrove grindability index		58
Free swelling index (FSI) ..		5 1/2
Moisture (as rec'd)		
Inherent	%	1.31
Adherent	%	-

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1029	1402
Spherical	°C	1066	1416
Hemispherical	°C	1068	1432
Fluid	°C	1082	1454

Notes:

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Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	27-10-82
Sampling location	Grand Lake Power Station (NBEPC) Dragline 7200
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4661-82
Ash analysis, %:	
SiO_2	19.54
Al_2O_3	7.55
Fe_2O_3	55.78
Mn_3O_4	-
TiO_2	0.35
P_2O_5	1.69
CaO	6.93
MgO	0.21
SO_3	7.38
Na_2O	0.06
K_2O	0.52
SrO	-
BaO	-
Loss on fusion (LOF)	0.87
Volatile trace element analysis µg/g (ppm)	
Hg	0.63
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

N.B. COAL LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	28-10-82
Sampling location	Dragline 8200
Product name	Seam Sample
Screen opening, mm (Screen opening, in)	
ERL number	4662-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.27		
Ash	%	20.50	20.76	
Volatile	%	31.22	31.62	39.90
Fixed carbon	%	47.01	47.62	60.10
Ultimate:				
Carbon	%	63.03	63.84	80.57
Hydrogen	%	4.04	4.09	5.16
Sulphur (Pyritic)	%	(7.82)	(7.92)	-
(Sulphate)	%	(0.14)	(0.14)	-
(Organic)	%	(1.46)	(1.48)	(1.87)
Total	%	9.42	9.54	-
Nitrogen	%	0.98	0.99	1.25
Ash	%	20.50	20.76	-
Oxygen, by difference	%	0.76	0.78	0.98
Heating value:				
	MJ/kg	27.48	27.83	35.12
	kcal/kg	6563	6647	8388
	Btu/lb	11,813	11,965	15,100

Hardgrove grindability index		56
Free swelling index (FSI) ..		5 1/2
Moisture (as rec'd)		
Inherent	%	1.27
Adherent	%	-

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1091	1393
Spherical	°C	1104	1410
Hemispherical	°C	1163	1413
Fluid	°C	1177	1421

Notes:

N.B. COAL LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	28-10-82
Sampling location	Dragline 8200
Product name	Seam Sample
Screen opening, mm (Screen opening, in)	
ERL number	4662-82
Ash analysis, %:	
SiO_2	30.93
Al_2O_3	11.32
Fe_2O_3	50.90
Mn_3O_4	-
TiO_2	0.52
P_2O_5	0.96
CaO	1.94
MgO	0.51
SO_3	1.57
Na_2O	0.12
K_2O	1.37
SrO	-
BaO	-
Loss on fusion (LOF)	0.44
Volatile trace element analysis µg/g (ppm)	
Hg	0.65
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

N.B. COAL LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	2-11-82
Sampling location	Midlands Loading Depot Dragline 8200
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4663-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.01		
Ash	%	11.48	11.60	
Volatile	%	35.83	36.20	40.95
Fixed carbon	%	51.68	52.20	59.05
Ultimate:				
Carbon	%	73.21	73.96	83.67
Hydrogen	%	4.62	4.67	5.28
Sulphur (Pyritic)	%	(4.45)	(4.50)	-
(Sulphate)	%	(0.06)	(0.06)	-
(Organic)	%	(1.54)	(1.55)	(1.75)
Total	%	6.05	6.11	-
Nitrogen	%	1.21	1.22	1.38
Ash	%	11.48	11.60	-
Oxygen, by difference	%	2.42	2.44	2.76
Heating value:				
	MJ/kg	31.28	31.60	35.75
	kcal/kg	7471	7547	8537
	Btu/lb	13,448	13,585	15,368

Hardgrove grindability index		61
Free swelling index (FSI) ..		6 1/2
Moisture (as rec'd)		
Inherent	%	1.01
Adherent	%	-

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1052	1379
Spherical	°C	1163	1396
Hemispherical	°C	1077	1402
Fluid	°C	1121	1407

Notes:

N.B. COAL LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	2-11-82
Sampling location	Midlands Loading Depot Dragline 8200
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4663-82
Ash analysis, %:	
SiO_2	27.79
Al_2O_3	9.18
Fe_2O_3	49.72
Mn_3O_4	-
TiO_2	0.52
P_2O_5	2.70
CaO	5.09
MgO	0.47
SO_3	3.75
Na_2O	0.10
K_2O	0.44
SrO	0.01
BaO	-
Loss on fusion (LOF)	0.52
Volatile trace element analysis µg/g (ppm)	
Hg	0.20
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

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Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	28-10-82
Sampling location	Dragline 7400
Product name	Seam Sample
Screen opening, mm (Screen opening, in)	
ERL number	4664-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	0.88		
Ash	%	17.86	18.02	
Volatile	%	33.79	34.09	41.58
Fixed carbon	%	47.47	47.89	58.42
Ultimate:				
Carbon	%	65.89	66.47	81.08
Hydrogen	%	4.23	4.27	5.21
Sulphur (Pyritic)	%	(6.56)	(6.62)	-
(Sulphate)	%	(0.10)	(0.10)	-
(Organic)	%	(1.22)	(1.23)	(1.50)
Total	%	7.88	7.95	-
Nitrogen	%	1.10	1.11	1.35
Ash	%	17.86	18.02	-
Oxygen, by difference	%	2.16	2.18	2.66
Heating value:				
	MJ/kg	28.72	28.97	35.34
	kcal/kg	6859	6920	8441
	Btu/lb	13,346	12,456	15,194

Hardgrove grindability index	58	
Free swelling index (FSI) ..	6 1/2	
Moisture (as rec'd)		
Inherent ..... %	0.88	
Adherent ..... %	-	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1038	1368
Spherical	°C	1052	1391
Hemispherical	°C	1116	1396
Fluid	°C	1121	1404

Notes:

N.B. COAL LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	28-10-82
Sampling location	Dragline 7400
Product name	Seam Sample
Screen opening, mm	
(Screen opening, in)	
ERL number	4664-82
Ash analysis, %:	
SiO_2	28.40
Al_2O_3	8.71
Fe_2O_3	55.64
Mn_3O_4	-
TiO_2	0.41
P_2O_5	1.34
CaO	3.98
MgO	0.53
SO_3	4.39
Na_2O	0.10
K_2O	0.85
SrO	-
BaO	-
Loss on fusion (LOF)	0.69
Volatile trace element analysis µg/g (ppm)	
Hg	0.46
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

KNOX CONSTRUCTION LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date		27-10-82
Sampling location		Dragline 2400
Product name		Seam Sample
Screen opening, mm		
(Screen opening, in)		
ERL number		4665-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	0.74		
Ash	%	16.16	16.28	
Volatile	%	34.14	34.39	41.08
Fixed carbon	%	48.96	49.33	58.92
Ultimate:				
Carbon	%	68.65	69.16	82.61
Hydrogen	%	4.40	4.43	5.29
Sulphur (Pyritic)	%	(7.10)	(7.15)	-
(Sulphate)	%	(0.08)	(0.08)	-
(Organic)	%	(1.51)	(1.52)	(1.82)
Total	%	8.69	8.75	-
Nitrogen	%	1.23	1.24	1.48
Ash	%	16.16	16.28	-
Oxygen, by difference	%	0.13	0.14	0.17
Heating value:				
	MJ/kg	29.60	29.83	35.63
	kcal/kg	7071	7124	8509
	Btu/lb	12,728	12,823	15,317

Hardgrove grindability index		68
Free swelling index (FSI) ..		6 1/2
Moisture (as rec'd)		
Inherent	%	0.74
Adherent	%	-

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1082	1421
Spherical	°C	1091	1432
Hemispherical	°C	1093	1438
Fluid	°C	1241	1452

Notes:

KNOX CONSTRUCTION LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	27-10-82
Sampling location	Dragline 2400
Product name	Seam Sample
Screen opening, mm (Screen opening, in)	
ERL number	4665-82
Ash analysis, %:	
SiO_2	23.89
Al_2O_3	9.34
Fe_2O_3	59.68
Mn_3O_4	-
TiO_2	0.46
P_2O_5	0.78
CaO	1.87
MgO	0.87
SO_3	2.15
Na_2O	0.06
K_2O	1.37
SrO	-
BaO	-
Loss on fusion (LOF)	0.53
Volatile trace element analysis µg/g (ppm)	
Hg	0.43
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

KNOX CONSTRUCTION LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	27-10-82
Sampling location	Grand Lake Power Station (NBEPC) Dragline 2400
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4666-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.05		
Ash	%	23.10	23.35	
Volatile	%	30.65	30.98	40.42
Fixed carbon	%	45.20	45.67	59.58
Ultimate:				
Carbon	%	59.30	59.93	78.19
Hydrogen	%	3.71	3.75	4.89
Sulphur (Pyritic)	%	(9.98)	(10.09)	-
(Sulphate)	%	(0.29)	(0.29)	-
(Organic)	%	(1.98)	(2.00)	(2.61)
Total	%	12.25	12.38	-
Nitrogen	%	1.05	1.06	1.38
Ash	%	23.10	23.35	-
Oxygen, by difference	%	0.00	0.00	0.00
Heating value:				
	MJ/kg	26.10	26.38	34.42
	kcal/kg	6235	6301	8220
	Btu/lb	11,223	11,342	14,797

Hardgrove grindability index	57	
Free swelling index (FSI) ..	5 1/2	
Moisture (as rec'd)		
Inherent	%	1.05
Adherent	%	-

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1032	1432
Spherical	°C	1054	1435
Hemispherical	°C	1057	1441
Fluid	°C	1107	1443

Notes:

KNOX CONSTRUCTION LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	27-10-82
Sampling location	Grand Lake Power Station (NBEPC) Dragline 2400
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4666-82
Ash analysis, %:	
SiO_2	18.18
Al_2O_3	6.89
Fe_2O_3	59.59
Mn_3O_4	-
TiO_2	0.32
P_2O_5	1.15
CaO	6.04
MgO	0.24
SO_3	7.51
Na_2O	0.04
K_2O	0.49
SrO	-
BaO	-
Loss on fusion (LOF)	0.67
Volatile trace element analysis µg/g (ppm)	
Hg	0.47
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

KNOX CONSTRUCTION LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	27-10-82
Sampling location	Dragline 200
Product name	Seam Sample
Screen opening, mm (Screen opening, in)	
ERL number	4667-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.28		
Ash	%	18.43	18.67	
Volatile	%	33.75	34.19	42.04
Fixed carbon	%	46.54	47.14	57.96
Ultimate:				
Carbon	%	65.20	66.05	81.21
Hydrogen	%	4.12	4.17	5.13
Sulphur (Pyritic)	%	(5.30)	(5.37)	-
(Sulphate)	%	(0.18)	(0.18)	-
(Organic)	%	(1.44)	(1.46)	(1.80)
Total	%	6.92	7.01	-
Nitrogen	%	1.19	1.21	1.49
Ash	%	18.43	18.67	-
Oxygen, by difference	%	2.86	2.89	3.55
Heating value:				
	MJ/kg	28.27	28.63	35.20
	kcal/kg	6751	6839	8409
	Btu/lb	12,152	12,309	15,135

Hardgrove grindability index		52
Free swelling index (FSI) ..		6 1/2
Moisture (as rec'd)		
Inherent	%	1.28
Adherent	%	-

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1043	1304
Spherical	°C	1068	1368
Hemispherical	°C	1085	1377
Fluid	°C	1163	1410

Notes:

KNOX CONSTRUCTION LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	27-10-82
Sampling location	Dragline 200
Product name	Seam Sample
Screen opening, mm (Screen opening, in)	
ERL number	4667-82
Ash analysis, %:	
SiO_2	38.19
Al_2O_3	13.81
Fe_2O_3	35.45
Mn_3O_4	-
TiO_2	0.71
P_2O_5	3.11
CaO	4.78
MgO	0.66
SO_3	2.30
Na_2O	0.12
K_2O	0.89
SrO	-
BaO	-
Loss on fusion (LOF)	0.44
Volatile trace element analysis µg/g (ppm)	
Hg	0.30
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

KNOX CONSTRUCTION LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date		27-10-82		
Sampling location		Grand Lake Power Station (NBEPC) Dragline 200		
Product name		Mine Run		
Screen opening, mm (Screen opening, in)				
ERL number		4668-82		
Rank of coal		High-volatile A bituminous		
Proximate analysis:		**As Rec'd**	**Dry**	**Dry Ash Free**
Moisture	%	1.48		
Ash	%	20.52	20.83	
Volatile	%	32.00	32.48	41.03
Fixed carbon	%	46.00	46.69	58.97
Ultimate:				
Carbon	%	62.70	63.64	80.38
Hydrogen	%	3.94	4.00	5.05
Sulphur (Pyritic)	%	(6.09)	(6.18)	-
(Sulphate)	%	(0.29)	(0.29)	-
(Organic)	%	(1.17)	(1.19)	(1.50)
Total	%	7.55	7.66	-
Nitrogen	%	1.25	1.27	1.60
Ash	%	20.52	20.83	-
Oxygen, by difference	%	2.56	2.60	3.28
Heating value:				
	MJ/kg	27.39	27.81	35.13
	kcal/kg	6543	6641	8388
	Btu/lb	11,777	11,954	15,099
Hardgrove grindability index		54		
Free swelling index (FSI) ..		5		
Moisture (as rec'd)				
Inherent	%	1.48		
Adherent	%	-		
Ash fusibility temperature:		**Reducing**		**Oxidizing**
Initial	°C	1021		1293
Spherical	°C	1046		1354
Hemispherical	°C	1049		1368
Fluid	°C	1149		1374

Notes:

KNOX CONSTRUCTION LIMITED
Dragline Operations; Minto/Chipman Area; Minto Coalfield
Minto, Sunbury/Queens Counties, New Brunswick

Sampling date	27-10-82
Sampling location	Grand Lake Power Station (NBEPC) Dragline 200
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4668-82
Ash analysis, %:	
SiO_2	19.52
Al_2O_3	7.55
Fe_2O_3	55.79
Mn_3O_4	-
TiO_2	0.35
P_2O_5	1.69
CaO	6.93
MgO	0.21
SO_3	7.37
Na_2O	0.12
K_2O	0.52
SrO	-
BaO	-
Loss on fusion (LOF)	0.77
Volatile trace element analysis µg/g (ppm)	
Hg	0.22
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

R. MILLS COAL COMPANY
Coal Reclamation Project; Waste Dumps; Minto Coalfield
Midlands, Sunbury/Queens Counties, New Brunswick

Sampling date	2-11-82
Sampling location	Pilot Recovery Plant (stockpile)
Product name	Fines
Screen opening, mm (Screen opening, in)	Minus 6.4, sq
ERL number	4669-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	12.40		
Ash	%	20.91	23.87	
Volatile	%	26.42	30.16	39.62
Fixed carbon	%	40.27	45.97	60.38
Ultimate:				
Carbon	%	53.03	60.54	79.52
Hydrogen	%	3.39	3.87	5.08
Sulphur (Pyritic)	%	(2.23)	(2.54)	-
(Sulphate)	%	(0.49)	(0.56)	-
(Organic)	%	(1.35)	(1.54)	(2.02)
Total	%	4.07	4.64	-
Nitrogen	%	1.29	1.47	1.93
Ash	%	20.91	23.87	-
Oxygen, by difference	%	4.91	5.61	7.37
Heating value:				
	MJ/kg	22.66	25.87	33.98
	kcal/kg	5412	6178	8115
	Btu/lb	9742	11,121	14,608

Hardgrove grindability index

Free swelling index (FSI) .. 6 1/2

Moisture (as rec'd)

Inherent	%	1.43
Adherent	%	10.97

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1107	1324
Spherical	°C	1268	1402
Hemispherical	°C	1291	1410
Fluid	°C	1329	1427

Notes:

R. MILLS COAL COMPANY
Coal Reclamation Project; Waste Dumps; Minto Coalfield
Midlands, Sunbury/Queens Counties, New Brunswick

Sampling date	2-11-82
Sampling location	Pilot Recovery Plant (stockpile)
Product name	Fines
Screen opening, mm (Screen opening, in)	Minus 6.4, sq
ERL number	4669-82
Ash analysis, %:	
SiO_2	30.95
Al_2O_3	11.32
Fe_2O_3	50.95
Mn_3O_4	-
TiO_2	0.52
P_2O_5	0.96
CaO	1.94
MgO	0.51
SO_3	1.57
Na_2O	0.21
K_2O	1.37
SrO	-
BaO	-
Loss on fusion (LOF)	0.33
Volatile trace element analysis µg/g (ppm)	
Hg	0.34
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

R. MILLS COAL COMPANY
Coal Reclamation Project; Waste Dumps; Minto Coalfield
Midlands, Sunbury/Queens Counties, New Brunswick

Sampling date	27-10-82
Sampling location	Grand Lake Power Station (NBEPC)
Product name	Fines
Screen opening, mm (Screen opening, in)	Minus 6.4, sq
ERL number	4670-82

Rank of coal ..... High-volatile A bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	14.95		
Ash	%	24.89	29.27	
Volatile	%	24.21	28.46	40.24
Fixed carbon	%	35.95	42.27	59.76
Ultimate:				
Carbon	%	48.74	57.31	81.03
Hydrogen	%	3.08	3.62	5.12
Sulphur (Pyritic)	%	(3.61)	(4.24)	-
(Sulphate)	%	(0.42)	(0.50)	-
(Organic)	%	(0.63)	(0.74)	(1.05)
Total	%	4.66	5.48	-
Nitrogen	%	0.33	0.39	0.55
Ash	%	24.89	29.27	-
Oxygen, by difference	%	3.34	3.93	5.56
Heating value:				
	MJ/kg	20.32	23.89	33.78
	kcal/kg	4853	5706	8067
	Btu/lb	8735	10,270	14,520

Hardgrove grindability index

Free swelling index (FSI) .. 5 1/2

Moisture (as rec'd)

Inherent	%	1.19
Adherent	%	13.76

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1116	1324
Spherical	°C	1157	1393
Hemispherical	°C	1199	1418
Fluid	°C	1316	1421

Notes:

R. MILLS COAL COMPANY
Coal Reclamation Project; Waste Dumps; Minto Coalfield
Midlands, Sunbury/Queens Counties, New Brunswick

Sampling date	27-11-82
Sampling location	Grand Lake Power Station (NBEPC)
Product name	Fines
Screen opening, mm (Screen opening, in)	Minus 6.4, sq
ERL number	4670-82
Ash analysis, %:	
SiO_2	50.55
Al_2O_3	16.09
Fe_2O_3	23.89
Mn_3O_4	-
TiO_2	0.82
P_2O_5	0.65
CaO	0.89
MgO	1.13
SO_3	1.14
Na_2O	0.24
K_2O	2.74
SrO	-
BaO	-
Loss on fusion (LOF)	0.27
Volatile trace element analysis µg/g (ppm)	
Hg	0.33
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

COAL ANALYSES - SASKATCHEWAN

BIENFAIT COAL COMPANY LIMITED
Bienfait Mine; Estevan Coal Zone; Estevan Coalfield
Bienfait, Saskatchewan

Sampling date		15-9-82	
Sampling location		Mine (Sec. 17, Twp. 2; R6, W2)	
Product name		Mine Run	
Screen opening, mm (Screen opening, in)			
ERL number		4389-82	
Rank of coal		Lignite A	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	33.99		
Ash	%	6.01	9.10	
Volatile	%	28.51	43.19	47.51
Fixed carbon	%	31.49	47.71	52.49
Ultimate:				
Carbon	%	44.04	66.72	73.40
Hydrogen	%	3.00	4.54	4.99
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.44	0.67	-
Nitrogen	%	1.26	1.91	2.10
Ash	%	6.01	9.10	-
Oxygen, by difference	%	11.26	17.06	18.77
Heating value:				
	MJ/kg	17.13	25.95	28.55
	kcal/kg	4091	6198	6818
	Btu/lb	7365	11,157	12,274
Hardgrove grindability index		40		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1149		
Spherical	°C	1174		
Hemispherical	°C	1177		
Fluid	°C	1199		

Notes: Bienfait Coal Company Limited, a subsidiary of Luscar Ltd., operates the Bienfait Mine.

BIENFAIT COAL COMPANY LIMITED
Bienfait Mine; Estevan Coal Zone; Estevan Coalfield
Bienfait, Saskatchewan

Sampling date	15-9-82
Sampling location	Mine (Sec. 17, Twp. 2; R6, W2)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4389-82

Ash analysis, %:

SiO_2	24.35
Al_2O_3	14.68
Fe_2O_3	6.50
Mn_3O_4	-
TiO_2	0.65
P_2O_5	1.48
CaO	19.56
MgO	3.32
SO_3	14.91
Na_2O	10.16
K_2O	0.24
SrO	0.79
BaO	1.19
Loss on fusion (LOF)	0.54

Volatile trace element analysis µg/g (ppm)

Hg	0.09
Cl	
F	
Br	
As	
Se	

Non-volatile trace element analysis µg/g (ppm)

Ba	
Sr	
V	
Mn	
Cr	

Notes:

BIENFAIT COAL COMPANY LIMITED
Bienfait Mine; Estevan Coal Zone; Estevan Coalfield
Bienfait, Saskatchewan

Sampling date		15-9-82	
Sampling location		Mine (Sec. 17, Twp. 2; R6, W2)	
Product name		Mine Run	
Screen opening, mm (Screen opening, in)			
ERL number		4390-82	
Rank of coal		Lignite A	
Proximate analysis:		**As Rec'd**	**Dry**	**Dry Ash Free**
Equilibrium moisture	%	34.45		
Ash	%	4.25	6.49	
Volatile	%	29.00	44.24	47.51
Fixed carbon	%	32.30	49.27	52.69
Ultimate:				
Carbon	%	44.24	67.49	72.17
Hydrogen	%	3.02	4.61	4.93
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.53	0.80	-
Nitrogen	%	1.36	2.08	2.22
Ash	%	4.25	6.49	-
Oxygen, by difference	%	12.15	18.53	19.82
Heating value:				
	MJ/kg	17.08	26.06	27.87
	kcal/kg	4080	6225	6657
	Btu/lb	7344	11,204	11,982
Hardgrove grindability index		37		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		**Reducing**		**Oxidizing**
Initial	°C	1302		
Spherical	°C	1316		
Hemispherical	°C	1318		
Fluid	°C	1321		

Notes: Bienfait Coal Company Limited, a subsidiary of Luscar Ltd., operates the Bienfait Mine.

BIENFAIT COAL COMPANY LIMITED
Bienfait Mine; Estevan Coal Zone; Estevan Coalfield
Bienfait, Saskatchewan

Sampling date	15-9-82
Sampling location	Mine (Sec. 17, Twp. 2; R6, W2)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4390-82
Ash analysis, %:	
SiO_2	13.80
Al_2O_3	12.57
Fe_2O_3	8.80
Mn_3O_4	-
TiO_2	0.42
P_2O_5	0.48
CaO	33.01
MgO	6.45
SO_3	21.31
Na_2O	0.97
K_2O	0.12
SrO	0.54
BaO	0.77
Loss on fusion (LOF)	1.76
Volatile trace element analysis µg/g (ppm)	
Hg	0.02
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANITOBA AND SASKATCHEWAN COAL COMPANY LIMITED
Boundary Dam Mine; Estevan Coal Zone; Estevan Coalfield
Estevan, Saskatchewan

Sampling date			15-9-82	
Sampling location			Mine (N.E. Qtr. Sec. 34, Twp. 1; R8, W2)	
Product name			Mine Run	
Screen opening, mm (Screen opening, in)				
ERL number			4391-82	
Rank of coal			Lignite A	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	33.71		
Ash	%	9.00	13.58	
Volatile	%	26.81	40.45	46.81
Fixed carbon	%	30.48	45.97	53.19
Ultimate:				
Carbon	%	41.36	62.39	72.19
Hydrogen	%	2.76	4.17	4.83
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.43	0.65	-
Nitrogen	%	1.18	1.77	2.05
Ash	%	9.00	13.58	-
Oxygen, by difference	%	11.56	17.44	20.18
Heating value:				
	MJ/kg	16.00	24.13	27.92
	kcal/kg	3821	5764	6670
	Btu/lb	6878	10,375	12,005
Hardgrove grindability index		53		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1146		
Spherical	°C	1182		
Hemispherical	°C	1202		
Fluid	°C	1302		

Notes: Manitoba and Saskatchewan Coal Company Ltd., a subsidiary of Luscar Ltd., operates the Boundary Dam Mine.

MANITOBA AND SASKATCHEWAN COAL COMPANY LIMITED
Boundary Dam Mine; Estevan Coal Zone; Estevan Coalfield
Estevan, Saskatchewan

Sampling date	15-9-82
Sampling location	Mine (N.E. Qtr. Sec. 34, Twp. 1; R8, W2)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4391-82

Ash analysis, %:

SiO_2	37.11
Al_2O_3	20.10
Fe_2O_3	3.50
Mn_3O_4	-
TiO_2	0.55
P_2O_5	1.02
CaO	16.89
MgO	4.04
SO_3	9.45
Na_2O	2.69
K_2O	0.44
SrO	0.55
BaO	1.10
Loss on fusion (LOF)	0.58

Volatile trace element analysis µg/g (ppm)

Hg	0.06
Cl	
F	
Br	
As	
Se	

Non-volatile trace element analysis µg/g (ppm)

Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Costello Mine; Estevan Seam; Estevan Coalfield
Estevan, Saskatchewan

Sampling date			16-9-82	
Sampling location			Mine (N.E. Qtr. Sec. 16, Twp. 2; R7, W2)	
Product name			Mine Run	
Screen opening, mm (Screen opening, in)				
ERL number			4393-82	
Rank of coal			Lignite A	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	35.03		
Ash	%	5.86	9.02	
Volatile	%	26.83	41.30	45.39
Fixed carbon	%	32.28	49.68	54.61
Ultimate:				
Carbon	%	43.43	66.85	73.48
Hydrogen	%	2.93	4.50	4.95
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.44	0.68	-
Nitrogen	%	1.18	1.82	2.00
Ash	%	5.86	9.02	-
Oxygen, by difference	%	11.13	17.13	18.83
Heating value:				
	MJ/kg	16.59	25.53	28.06
	kcal/kg	3962	6098	6703
	Btu/lb	7132	10,977	12,065
Hardgrove grindability index		42		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1149		
Spherical	°C	1179		
Hemispherical	°C	1182		
Fluid	°C	1185		

Notes: Costello Mine, formerly the Klimax Mine.

MANALTA COAL LIMITED
Costello Mine; Estevan Seam; Estevan Coalfield
Estevan, Saskatchewan

Sampling date	16-9-82
Sampling location	Mine (N.E. Qtr. Sec. 16, Twp. 2; R7, W2)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4393-82

Ash analysis, %:

SiO_2	26.80
Al_2O_3	14.27
Fe_2O_3	3.47
Mn_3O_4	-
TiO_2	0.76
P_2O_5	0.73
CaO	20.33
MgO	4.17
SO_3	15.73
Na_2O	9.97
K_2O	0.07
SrO	0.69
BaO	0.88
Loss on fusion (LOF)	0.37

Volatile trace element analysis µg/g (ppm)

Hg	0.07
Cl	
F	
Br	
As	
Se	

Non-volatile trace element analysis µg/g (ppm)

Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Utility Mine; Estevan Seam; Estevan Coalfield
Estevan, Saskatchewan

Sampling date		16-9-82	
Sampling location		Mine (N.E. Qtr. Sec. 30, Twp. 1; R8, W2)	
Product name		Mine Run	
Screen opening, mm (Screen opening, in)			
ERL number		4392-82	
Rank of coal		Lignite A	
Proximate analysis:		**As Rec'd**	**Dry**	**Dry Ash Free**
Equilibrium moisture	%	34.11		
Ash	%	8.60	13.05	
Volatile	%	25.80	39.15	45.03
Fixed carbon	%	31.49	47.80	54.97
Ultimate:				
Carbon	%	41.18	62.49	71.87
Hydrogen	%	2.67	4.05	4.66
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.19	0.29	-
Nitrogen	%	1.13	1.72	1.98
Ash	%	8.60	13.05	-
Oxygen, by difference	%	12.12	18.40	21.16
Heating value:				
	MJ/kg	15.84	24.04	27.65
	kcal/kg	3783	5742	6604
	Btu/lb	6810	10,336	11,887
Hardgrove grindability index		53		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		**Reducing**		**Oxidizing**
Initial	°C	1152		
Spherical	°C	1160		
Hemispherical	°C	1171		
Fluid	°C	1254		

Notes: Utility Mine is owned by Saskatchewan Power Corp., with Manalta Coal Ltd. as operator.

MANALTA COAL LIMITED
Utility Mine; Estevan Seam; Estevan Coalfield
Estevan, Saskatchewan

Sampling date	16-9-82
Sampling location	Mine (N.E. Qtr. Sec. 30, Twp. 1; R8, W2)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4392-82

Ash analysis, %:

SiO_2	35.41
Al_2O_3	24.55
Fe_2O_3	3.16
Mn_3O_4	-
TiO_2	0.56
P_2O_5	0.71
CaO	15.78
MgO	3.02
SO_3	6.81
Na_2O	6.96
K_2O	0.04
SrO	0.51
BaO	1.26
Loss on fusion (LOF)	0.28

Volatile trace element analysis µg/g (ppm)

Hg	0.04
Cl	
F	
Br	
As	
Se	

Non-volatile trace element analysis µg/g (ppm)

Ba	
Sr	
V	
Mn	
Cr	

Notes:

SASKATCHEWAN POWER CORPORATION
Souris Valley Mine; Estevan Seam; Estevan Coalfield
Estevan, Saskatchewan

Sampling date			17-9-82	
Sampling location			Mine (N.E. Qtr. Sec. 2, Twp. 2; R7, W2)	
Product name			Mine Run	
Screen opening, mm				
(Screen opening, in)				
ERL number			4394-82	
Rank of coal			Lignite A	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	36.23		
Ash	%	6.04	9.47	
Volatile	%	25.82	40.49	44.73
Fixed carbon	%	31.91	50.04	55.27
Ultimate:				
Carbon	%	42.38	66.46	73.41
Hydrogen	%	2.84	4.45	4.92
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.55	0.86	-
Nitrogen	%	1.17	1.84	2.03
Ash	%	6.04	9.47	-
Oxygen, by difference	%	10.79	16.92	18.69
Heating value:				
	MJ/kg	16.31	25.57	28.24
	kcal/kg	3894	6107	6746
	Btu/lb	7010	10,993	12,143
Hardgrove grindability index		49		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1154		
Spherical	°C	1221		
Hemispherical	°C	1224		
Fluid	°C	1227		

Notes:

SASKATCHEWAN POWER CORPORATION
Souris Valley Mine; Estevan Seam; Estevan Coalfield
Estevan, Saskatchewan

Sampling date	17-9-82
Sampling location	Mine (N.E. Qtr. Sec. 2, Twp. 2; R7, W2)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4394-82

Ash analysis, %:

SiO_2	21.98
Al_2O_3	16.13
Fe_2O_3	5.89
Mn_3O_4	-
TiO_2	0.49
P_2O_5	0.96
CaO	19.44
MgO	4.55
SO_3	18.93
Na_2O	7.42
K_2O	0.13
SrO	0.57
BaO	0.81
Loss on fusion (LOF)	0.61

Volatile trace element analysis µg/g (ppm)

Hg	0.10
Cl	
F	
Br	
As	
Se	

Non-volatile trace element analysis µg/g (ppm)

Ba	
Sr	
V	
Mn	
Cr	

Notes:

SASKATCHEWAN POWER CORPORATION
Poplar River Mine; Hart Seam; Willow Bunch Coalfield
Coronach, Saskatchewan

Sampling date		14-9-82
Sampling location		Mine (Sec. 5, Twp. 2; R27, W2)
Product name		Mine Run
Screen opening, mm (Screen opening, in)		
ERL number		4388-82
Rank of coal		Lignite A

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	35.22		
Ash	%	11.19	17.27	
Volatile	%	25.58	39.48	47.72
Fixed carbon	%	28.01	43.25	52.28
Ultimate:				
Carbon	%	38.06	58.75	71.01
Hydrogen	%	2.43	3.75	4.53
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.50	0.77	-
Nitrogen	%	0.91	1.40	1.69
Ash	%	11.19	17.27	-
Oxygen, by difference	%	11.69	18.06	21.83
Heating value:				
	MJ/kg	13.94	21.52	26.01
	kcal/kg	3330	5140	6213
	Btu/lb	5993	9252	11,183

Hardgrove grindability index		66
Free swelling index (FSI) ..		N/A
Moisture (as rec'd)		
Inherent	%	
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1171	
Spherical	°C	1221	
Hemispherical	°C	1224	
Fluid	°C	1235	

Notes:

SASKATCHEWAN POWER CORPORATION
Poplar River Mine; Hart Seam; Willow Bunch Coalfield
Estevan, Saskatchewan

Sampling date	14-9-82
Sampling location	Mine (Sec. 5, Twp. 2; R27, W2)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4388-82

Ash analysis, %:

SiO_2	34.08
Al_2O_3	21.52
Fe_2O_3	5.22
Mn_3O_4	-
TiO_2	0.63
P_2O_5	0.56
CaO	18.74
MgO	4.80
SO_3	10.00
Na_2O	0.58
K_2O	0.60
SrO	0.24
BaO	0.78
Loss on fusion (LOF)	1.00

Volatile trace element analysis µg/g (ppm)

Hg	0.06
Cl	
F	
Br	
As	
Se	

Non-volatile trace element analysis µg/g (ppm)

Ba	
Sr	
V	
Mn	
Cr	

Notes:

COAL ANALYSES - ALBERTA PLAINS REGION

FORESTBURG COLLIERIES LIMITED
Diplomat Mine (Mine No. 1578); South Seam; Battle River Coalfield
Forestburg, Plains Region, Alberta

Sampling date		17-6-82	
Sampling location		Mine (Sec. 6, Twp. 41; R15, W4)	
Product name		Mine Run	
Screen opening, mm (Screen opening, in)			
ERL number		3641-82	
Rank of coal		Subbituminous C	
Proximate analysis:		**As Rec'd**	**Dry**	**Dry Ash Free**
Equilibrium moisture	%	22.93		
Ash	%	10.46	13.57	
Volatile	%	31.91	41.41	47.91
Fixed carbon	%	34.70	45.02	52.09
Ultimate:				
Carbon	%	47.15	61.18	70.79
Hydrogen	%	3.30	4.28	4.95
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.49	0.64	-
Nitrogen	%	1.05	1.36	1.57
Ash	%	10.46	13.57	-
Oxygen, by difference	%	14.62	18.97	21.95
Heating value:				
	MJ/kg	19.23	24.95	28.87
	kcal/kg	4593	5959	6895
	Btu/lb	8267	10,727	12,411
Hardgrove grindability index		28		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		**Reducing**		**Oxidizing**
Initial	°C	1343		
Spherical	°C	1460		
Hemispherical	°C	1482+		
Fluid	°C	1482+		

Notes: Forestburg Collieries Ltd. is a subsidiary of Luscar Ltd. and operates the Diplomat Mine.

FORESTBURG COLLIERIES LIMITED
Diplomat Mine (Mine No. 1578); South Seam; Battle River Coalfield
Forestburg, Plains Region, Alberta

Sampling date	17-6-82
Sampling location	Mine (Sec. 6, Twp. 41; R15, W2)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3641-82

Ash analysis, %:

SiO_2	54.87
Al_2O_3	26.09
Fe_2O_3	3.79
Mn_3O_4	-
TiO_2	1.00
P_2O_5	0.60
CaO	4.14
MgO	0.78
SO_3	2.47
Na_2O	1.42
K_2O	0.42
SrO	0.16
BaO	0.76
Loss on fusion (LOF)	1.55

Volatile trace element analysis µg/g (ppm)

Hg	0.03
Cl	
F	
Br	
As	
Se	

Non-volatile trace element analysis µg/g (ppm)

Ba	
Sr	
V	
Mn	
Cr	

Notes:

FORESTBURG COLLIERIES LIMITED
Diplomat Mine (Mine No. 1578); North Seam; Battle River Coalfield
Forestburg, Plains Region, Alberta

Sampling date			17-6-82	
Sampling location			Mine	
Product name			Mine Run	
Screen opening, mm				
(Screen opening, in)				
ERL number			3649-82	
Rank of coal			Subbituminous C	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	24.03		
Ash	%	12.09	15.92	
Volatile	%	28.48	37.49	44.59
Fixed carbon	%	35.40	46.59	55.41
Ultimate:				
Carbon	%	46.27	60.90	72.43
Hydrogen	%	3.21	4.23	5.03
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.52	0.68	-
Nitrogen	%	1.01	1.33	1.58
Ash	%	12.09	15.92	-
Oxygen, by difference	%	12.87	16.94	20.15
Heating value:				
	MJ/kg	18.27	24.05	28.60
	kcal/kg	4364	5745	6833
	Btu/lb	7856	10,341	12,299
Hardgrove grindability index		29		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1202		
Spherical	°C	1257		
Hemispherical	°C	1321		
Fluid	°C	1332		

Notes: Forestburg Collieries Ltd. is a subsidiary of Luscar Ltd. and operates the Diplomat Mine.

FORESTBURG COLLIERIES LIMITED
Diplomat Mine (Mine No. 1578); South Seam; Battle River Coalfield
Forestburg, Plains Region, Alberta

Sampling date	17-6-82
Sampling location	Mine
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3649-82

Ash analysis, %:

SiO_2	56.46
Al_2O_3	18.42
Fe_2O_3	4.60
Mn_3O_4	-
TiO_2	0.45
P_2O_5	0.47
CaO	8.49
MgO	2.51
SO_3	5.29
Na_2O	0.75
K_2O	0.77
SrO	-
BaO	-
Loss on fusion (LOF)	0.96

Volatile trace element analysis µg/g (ppm)

Hg	0.04
Cl	
F	
Br	
As	
Se	

Non-volatile trace element analysis µg/g (ppm)

Ba	
Sr	
V	
Mn	
Cr	

Notes:

FORESTBURG COLLIERIES LIMITED
Paintearth Mine (Mine No. 1781); Upper & Lower Seams;
Battle River Coalfield
Forestburg, Plains Region, Alberta

Sampling date			17-6-82	
Sampling location			Mine (N.E. Qtr. Sec. 1, Twp. 40; R16, W4)	
Product name			Mine Run	
Screen opening, mm (Screen opening, in)				
ERL number			3629-82	
Rank of coal			Subbituminous C	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	25.04		
Ash	%	5.11	6.82	
Volatile	%	30.65	40.89	43.88
Fixed carbon	%	39.20	52.29	56.12
Ultimate:				
Carbon	%	49.28	65.74	70.55
Hydrogen	%	3.32	4.43	4.75
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.42	0.56	-
Nitrogen	%	0.94	1.26	1.35
Ash	%	5.11	6.82	-
Oxygen, by difference	%	15.89	21.19	22.74
Heating value:				
	MJ/kg	20.01	26.69	28.64
	kcal/kg	4778	6374	6841
	Btu/lb	8601	11,474	12,314
Hardgrove grindability index		24		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1027		
Spherical	°C	1146		
Hemispherical	°C	1149		
Fluid	°C	1154		

Notes: Forestburg Collieries Ltd. is a subsidiary of Luscar Ltd., operates the Paintearth Mine.

FORESTBURG COLLIERIES LIMITED
Paintearth Mine (Mine No. 1781); Upper & Lower Seams;
Battle River Coalfield
Forestburg, Plains Region, Alberta

Sampling date	17-6-82
Sampling location	Mine (N.E. Qtr. Sec. 1, Twp. 40; R16, W4)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3629-82

Ash analysis, %:

SiO_2	31.47
Al_2O_3	16.09
Fe_2O_3	6.74
Mn_3O_4	-
TiO_2	0.48
P_2O_5	0.92
CaO	18.07
MgO	1.35
SO_3	11.86
Na_2O	8.98
K_2O	0.29
SrO	-
BaO	-
Loss on fusion (LOF)	1.25

Volatile trace element analysis µg/g (ppm)

Hg	0.01
Cl	
F	
Br	
As	
Se	

Non-volatile trace element analysis µg/g (ppm)

Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Vesta Mine (Mine No. 1046); Seam No. 1 (top seam);
Battle River Coalfield
Halkirk, Plains Region, Alberta

Sampling date		17-6-82	
Sampling location		Mine (LSD 12, Sec. 19, Twp. 40; R15, W4)	
Product name		Mine Run	
Screen opening, mm (Screen opening, in)			
ERL number		3642-82	
Rank of coal		Subbituminous C	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	24.13		
Ash	%	12.44	16.39	
Volatile	%	27.83	36.68	43.87
Fixed carbon	%	35.60	46.93	56.13
Ultimate:				
Carbon	%	45.33	59.75	71.46
Hydrogen	%	3.12	4.11	4.92
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.36	0.48	-
Nitrogen	%	1.12	1.48	1.77
Ash	%	12.44	16.39	-
Oxygen, by difference	%	13.50	17.79	21.28
Heating value:				
	MJ/kg	17.98	23.70	28.35
	kcal/kg	4295	5661	6771
	Btu/lb	7731	10,190	12,188
Hardgrove grindability index		28		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1296		
Spherical	°C	1302		
Hemispherical	°C	1332		
Fluid	°C	1471		

Notes: Manalta Coal Ltd. operates the Vesta Mine for Alberta Power Ltd.

MANALTA COAL LIMITED
Vesta Mine (Mine No. 1046); Seam No. 1 (top seam);
Battle River Coalfield
Halkirk, Plains Region, Alberta

Sampling date	17-6-82
Sampling location	Mine (LSD 12, Sec. 19, Twp. 40; R15, W4)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3642-82
Ash analysis, %:	
SiO_2	47.93
Al_2O_3	26.05
Fe_2O_3	3.47
Mn_3O_4	-
TiO_2	0.31
P_2O_5	0.39
CaO	7.64
MgO	1.21
SO_3	4.24
Na_2O	3.97
K_2O	1.07
SrO	0.24
BaO	0.56
Loss on fusion (LOF)	1.65
Volatile trace element analysis µg/g (ppm)	
Hg	0.02
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Vesta Mine (Mine No. 1046); Seam No. 2 (middle seam);
Battle River Coalfield
Halkirk, Plains Region, Alberta

Sampling date			17-6-82	
Sampling location			Mine (LSD 12, Sec. 19, Twp. 40; R15, W4)	
Product name			Mine Run	
Screen opening, mm (Screen opening, in)				
ERL number			3646-82	
Rank of coal			Subbituminous C	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	27.05		
Ash	%	5.72	7.84	
Volatile	%	27.87	38.21	41.46
Fixed carbon	%	39.36	53.95	58.54
Ultimate:				
Carbon	%	48.48	66.46	72.11
Hydrogen	%	3.19	4.37	4.74
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.49	0.67	-
Nitrogen	%	1.00	1.37	1.49
Ash	%	5.72	7.84	-
Oxygen, by difference	%	14.07	19.29	20.93
Heating value:				
	MJ/kg	19.11	26.20	28.43
	kcal/kg	4564	6257	6789
	Btu/lb	8216	11,262	12,220
Hardgrove grindability index		21		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	993		
Spherical	°C	1099		
Hemispherical	°C	1121		
Fluid	°C	1210		

Notes: Manalta Coal Ltd. operates the Vesta Mine for Alberta Power Ltd.

MANALTA COAL LIMITED
Vesta Mine (Mine No. 1046); Seam No. 2 (middle seam);
Battle River Coalfield
Halkirk, Plains Region, Alberta

Sampling date	17-6-82
Sampling location	Mine (LSD 12, Sec. 19, Twp. 40; R15, W4)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3646-82
Ash analysis, %:	
SiO_2	44.43
Al_2O_3	11.84
Fe_2O_3	6.10
Mn_3O_4	-
TiO_2	0.27
P_2O_5	0.11
CaO	13.95
MgO	1.39
SO_3	7.14
Na_2O	7.27
K_2O	0.56
SrO	0.18
BaO	0.78
Loss on fusion (LOF)	5.48
Volatile trace element analysis µg/g (ppm)	
Hg	0.04
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Montgomery Mine (Mine No. 443); Seam "C" (lower seam);
Sheerness Coalfield
Hanna, Plains Region, Alberta

Sampling date			18-6-82	
Sampling location			Mine	
Product name			Mine Run (3.6 m seam section)	
Screen opening, mm				
(Screen opening, in)				
ERL number			3627-82	
Rank of coal			Subbituminous C	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	27.62		
Ash	%	5.46	7.54	
Volatile	%	29.47	40.72	44.04
Fixed carbon	%	37.45	51.74	55.96
Ultimate:				
Carbon	%	46.34	64.03	69.25
Hydrogen	%	3.12	4.31	4.66
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.50	0.69	-
Nitrogen	%	0.94	1.30	1.41
Ash	%	5.46	7.54	-
Oxygen, by difference	%	16.02	22.13	23.93
Heating value:				
	MJ/kg	18.72	25.87	27.98
	kcal/kg	4473	6180	6684
	Btu/lb	8051	11,123	12,030
Hardgrove grindability index		24		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1096		
Spherical	°C	1132		
Hemispherical	°C	1138		
Fluid	°C	1149		

Notes: Montgomery Mine is the former Roselyn Mine.

MANALTA COAL LIMITED
Montgomery Mine (Mine No. 443); Seam "C"; (lower seam);
Sheerness Coalfield
Hanna, Plains Region, Alberta

Sampling date	18-6-82
Sampling location	Mine Run (3.6 m seam section)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3627-82
Ash analysis, %:	
SiO_2	29.35
Al_2O_3	16.48
Fe_2O_3	10.96
Mn_3O_4	-
TiO_2	0.35
P_2O_5	0.34
CaO	18.34
MgO	3.85
SO_3	11.72
Na_2O	2.27
K_2O	0.36
SrO	0.20
BaO	0.76
Loss on fusion (LOF)	3.73
Volatile trace element analysis µg/g (ppm)	
Hg	0.02
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Montgomery Mine (Mine No. 443); Seam "C" (lower seam);
Sheerness Coalfield
Hanna, Plains Region, Alberta

Sampling date			18-6-82	
Sampling location			Mine	
Product name			Mine Run (2.4 m seam section)	
Screen opening, mm				
(Screen opening, in)				
ERL number			3635-82	
Rank of coal			Subbituminous C	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	26.10		
Ash	%	7.49	10.14	
Volatile	%	30.21	40.88	45.49
Fixed carbon	%	36.20	48.98	54.51
Ultimate:				
Carbon	%	47.79	64.67	71.97
Hydrogen	%	3.25	4.40	4.90
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.48	0.65	-
Nitrogen	%	1.01	1.37	1.52
Ash	%	7.49	10.14	-
Oxygen, by difference	%	13.88	18.77	20.89
Heating value:				
	MJ/kg	18.31	24.78	27.58
	kcal/kg	4374	5919	6587
	Btu/lb	7874	10,655	11,857
Hardgrove grindability index		24		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1066		
Spherical	°C	1088		
Hemispherical	°C	1099		
Fluid	°C	1129		

Notes: Montgomery Mine is the former Roselyn Mine.

MANALTA COAL LIMITED
Montgomery Mine (Mine No. 443); Seam "C"; (lower seam);
Sheerness Coalfield
Hanna, Plains Region, Alberta

Sampling date	18-6-82
Sampling location	Mine
Product name	Mine Run (2.4 m seam section)
Screen opening, mm	
(Screen opening, in)	
ERL number	3635-82
Ash analysis, %:	
SiO_2	25.73
Al_2O_3	15.70
Fe_2O_3	23.55
Mn_3O_4	-
TiO_2	0.35
P_2O_5	0.52
CaO	15.95
MgO	3.19
SO_3	8.26
Na_2O	1.10
K_2O	0.30
SrO	0.16
BaO	0.57
Loss on fusion (LOF)	4.17
Volatile trace element analysis µg/g (ppm)	
Hg	0.04
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Highvale Mine (Mine No. 1769); Seam No. 1; Wabamun Coalfield
Seba Beach, Plains Region, Alberta

Sampling date		29-6-82
Sampling location		Pit 02 (N.E. Qtr. Sec. 7, Twp. 52; R4, W5)
Product name		Mine Run
Screen opening, mm (Screen opening, in)		
ERL number		3639-82

Rank of coal ..... Subbituminous B

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	19.35		
Ash	%	12.27	15.22	
Volatile	%	28.53	35.37	41.72
Fixed carbon	%	39.85	49.41	58.28
Ultimate:				
Carbon	%	50.31	62.38	73.58
Hydrogen	%	3.12	3.86	4.55
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.23	0.29	-
Nitrogen	%	0.77	0.95	1.12
Ash	%	12.27	15.22	-
Oxygen, by difference	%	13.95	17.30	20.41
Heating value:				
	MJ/kg	19.46	24.13	28.46
	kcal/kg	4648	5763	6798
	Btu/lb	8366	10,373	12,235

Hardgrove grindability index 38

Free swelling index (FSI) .. N/A

Moisture (as rec'd)
- Inherent ..... %
- Adherent ..... %

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1346	
Spherical	°C	1379	
Hemispherical	°C	1416	
Fluid	°C	1435	

Notes: Highvale Mine is owned by TransAlta Utilities Corp. and operated by Manalta Coal Ltd.

MANALTA COAL LIMITED
Highvale Mine (Mine No. 1769); Seam No. 1; Wabamun Coalfield
Seba Beach, Plains Region, Alberta

Sampling date	29-6-82
Sampling location	Pit 02 (N.E. Qtr. Sec. 7, Twp. 52; R4, W5)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3639-82
Ash analysis, %:	
SiO_2	49.07
Al_2O_3	28.43
Fe_2O_3	2.87
Mn_3O_4	-
TiO_2	0.51
P_2O_5	-
CaO	10.56
MgO	0.94
SO_3	2.43
Na_2O	2.58
K_2O	0.48
SrO	0.13
BaO	0.58
Loss on fusion (LOF)	1.73
Volatile trace element analysis µg/g (ppm)	
Hg	0.09
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Highvale Mine (Mine No. 1769); Seam No. 2; Wabamun Coalfield
Seba Beach, Plains Region, Alberta

Sampling date	29-6-82
Sampling location	Pit 02 (N.E. Qtr. Sec. 7, Twp. 52; R4, W5)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3614-82

Rank of coal ..... Subbituminous B

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	20.82		
Ash	%	5.84	7.38	
Volatile	%	29.34	37.05	40.00
Fixed carbon	%	44.00	55.57	60.00
Ultimate:				
Carbon	%	54.98	69.44	74.97
Hydrogen	%	3.56	4.49	4.85
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.18	0.23	-
Nitrogen	%	0.66	0.83	0.90
Ash	%	5.84	7.38	-
Oxygen, by difference	%	13.96	17.63	19.03
Heating value:				
	MJ/kg	21.05	26.58	28.70
	kcal/kg	5026	6348	6854
	Btu/lb	9047	11,426	12,336

Hardgrove grindability index		36
Free swelling index (FSI) ..		N/A
Moisture (as rec'd)		
Inherent	%	
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1138	
Spherical	°C	1157	
Hemispherical	°C	1171	
Fluid	°C	1266	

Notes: Highvale Mine is owned by TransAlta Utilities Corp. and operated by Manalta Coal Ltd.

MANALTA COAL LIMITED
Highvale Mine (Mine No. 1769); Seam No. 2; Wabamun Coalfield
Seba Beach, Plains Region, Alberta

Sampling date	29-6-82
Sampling location	Pit 02 (N.E. Qtr. Sec. 7, Twp. 52; R4, W5)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3614-82
Ash analysis, %:	
SiO_2	34.11
Al_2O_3	22.30
Fe_2O_3	7.93
Mn_3O_4	-
TiO_2	0.05
P_2O_5	0.27
CaO	21.04
MgO	1.46
SO_3	3.41
Na_2O	4.72
K_2O	0.12
SrO	0.16
BaO	1.04
Loss on fusion (LOF)	2.46
Volatile trace element analysis µg/g (ppm)	
Hg	0.01
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Highvale Mine (Mine No. 1769); Seam No. 3; Wabamun Coalfield
Seba Beach, Plains Region, Alberta

Sampling date		29-6-82
Sampling location		Pit 02 (N.E. Qtr. Sec. 7, Twp. 52; R4, W5)
Product name		Mine Run
Screen opening, mm (Screen opening, in)		
ERL number		3634-82
Rank of coal		Subbituminous B

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	19.51		
Ash	%	10.15	12.61	
Volatile	%	27.92	34.69	39.70
Fixed carbon	%	42.42	52.70	60.30
Ultimate:				
Carbon	%	52.50	65.23	74.64
Hydrogen	%	3.16	3.93	4.50
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.33	0.41	-
Nitrogen	%	0.74	0.92	1.05
Ash	%	10.15	12.61	-
Oxygen, by difference	%	13.61	16.90	19.34
Heating value:				
	MJ/kg	20.10	24.97	28.57
	kcal/kg	4801	5965	6826
	Btu/lb	8641	10,736	12,285

Hardgrove grindability index		41
Free swelling index (FSI) ..		N/A
Moisture (as rec'd)		
Inherent	%	
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1138	
Spherical	°C	1166	
Hemispherical	°C	1204	
Fluid	°C	1304	

Notes: Highvale Mine is owned by TransAlta Utilities Corp. and operated by Manalta Coal Ltd.

MANALTA COAL LIMITED
Highvale Mine (Mine No. 1769); Seam No. 3; Wabamun Coalfield
Seba Beach, Plains Region, Alberta

Sampling date	29-6-82
Sampling location	Pit 02 (N.E. Qtr. Sec. 7, Twp. 52; R4, W5)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3634-82
Ash analysis, %:	
SiO_2	53.37
Al_2O_3	15.89
Fe_2O_3	4.83
Mn_3O_4	-
TiO_2	0.52
P_2O_5	0.27
CaO	13.44
MgO	0.99
SO_3	4.57
Na_2O	3.51
K_2O	0.56
SrO	-
BaO	-
Loss on fusion (LOF)	1.41
Volatile trace element analysis µg/g (ppm)	
Hg	0.06
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Highvale Mine (Mine No. 1769); Seam No. 4; Wabamun Coalfield
Seba Beach, Plains Region, Alberta

Sampling date		29-6-82	
Sampling location		Pit 02 (N.E. Qtr. Sec. 7, Twp. 52; R4, W5)	
Product name		Mine Run	
Screen opening, mm (Screen opening, in)			
ERL number		3633-82	
Rank of coal		Subbituminous B	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	19.17		
Ash	%	10.92	13.51	
Volatile	%	27.88	34.49	39.88
Fixed carbon	%	42.03	52.00	60.12
Ultimate:				
Carbon	%	53.31	65.95	76.25
Hydrogen	%	3.35	4.15	4.80
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.40	0.49	-
Nitrogen	%	0.65	0.81	0.94
Ash	%	10.92	13.51	-
Oxygen, by difference	%	12.20	15.09	17.45
Heating value:				
	MJ/kg	20.19	24.98	28.88
	kcal/kg	4822	5965	6897
	Btu/lb	8679	10,737	12,414
Hardgrove grindability index		39		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1127		
Spherical	°C	1199		
Hemispherical	°C	1363		
Fluid	°C	1410		

Notes: Highvale Mine is owned by TransAlta Utilities Corp. and operated by Manalta Coal Ltd.

MANALTA COAL LIMITED
Highvale Mine (Mine No. 1769); Seam No. 4; Wabamun Coalfield
Seba Beach, Plains Region, Alberta

Sampling date	29-6-82
Sampling location	Pit 02 (N.E. Qtr. Sec. 7, Twp. 52; R4, W5)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3633-82
Ash analysis, %:	
SiO_2	61.57
Al_2O_3	14.61
Fe_2O_3	2.22
Mn_3O_4	-
TiO_2	0.54
P_2O_5	0.15
CaO	10.66
MgO	0.94
SO_3	5.39
Na_2O	3.38
K_2O	0.12
SrO	-
BaO	-
Loss on fusion (LOF)	0.64
Volatile trace element analysis µg/g (ppm)	
Hg	0.04
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Highvale Mine (Mine No. 1769); Seam No. 6; Wabamun Coalfield
Seba Beach, Plains Region, Alberta

Sampling date		29-6-82
Sampling location		Pit 02 (N.E. Qtr. Sec. 7, Twp. 52; R4, W5)
Product name		Mine Run
Screen opening, mm (Screen opening, in)		
ERL number		3632-82

Rank of coal			Subbituminous B	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	19.37		
Ash	%	9.84	12.21	
Volatile	%	29.13	36.13	41.16
Fixed carbon	%	41.66	51.66	58.84
Ultimate:				
Carbon	%	51.86	64.31	73.25
Hydrogen	%	3.37	4.18	4.76
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.37	0.46	-
Nitrogen	%	0.75	0.93	1.06
Ash	%	9.84	12.21	-
Oxygen, by difference	%	14.44	17.91	20.40
Heating value:				
	MJ/kg	20.55	25.49	29.04
	kcal/kg	4909	6088	6935
	Btu/lb	8835	10,958	12,482

Hardgrove grindability index		36
Free swelling index (FSI) ..		N/A
Moisture (as rec'd)		
Inherent	%	
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1135	
Spherical	°C	1204	
Hemispherical	°C	1374	
Fluid	°C	1413	

Notes: Highvale Mine is owned by TransAlta Utilities Corp. and operated by Manalta Coal Ltd.

MANALTA COAL LIMITED
Highvale Mine (Mine No. 1769); Seam No. 6; Wabamun Coalfield
Seba Beach, Plains Region, Alberta

Sampling date	29-6-82
Sampling location	Pit 02 (N.E. Qtr. Sec. 7, Twp. 52; R4, W5)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3632-82
Ash analysis, %:	
SiO_2	52.75
Al_2O_3	20.62
Fe_2O_3	3.09
Mn_3O_4	-
TiO_2	1.05
P_2O_5	0.09
CaO	11.59
MgO	1.06
SO_3	5.02
Na_2O	4.06
K_2O	0.24
SrO	-
BaO	-
Loss on fusion (LOF)	0.36
Volatile trace element analysis µg/g (ppm)	
Hg	0.01
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Whitewood Mine (Mine No. 1757); Seam No. 1; Wabamun Coalfield
Wabamun, Plains Region, Alberta

Sampling date			30-6-82	
Sampling location			Mine (N.E. Qtr. Sec. 16, Twp. 53; R4, W5)	
Product name			Mine Run	
Screen opening, mm				
(Screen opening, in)				
ERL number			3645-82	
Rank of coal			Subbituminous C	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	21.12		
Ash	%	13.95	17.68	
Volatile	%	28.58	36.23	44.01
Fixed carbon	%	36.35	46.09	55.99
Ultimate:				
Carbon	%	45.66	57.88	70.31
Hydrogen	%	3.03	3.84	4.66
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.38	0.48	-
Nitrogen	%	0.65	0.83	1.01
Ash	%	13.95	17.68	-
Oxygen, by difference	%	15.21	19.29	23.43
Heating value:				
	MJ/kg	18.49	23.44	28.47
	kcal/kg	4416	5599	6802
	Btu/lb	7950	10,078	12,242
Hardgrove grindability index		35		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1154		
Spherical	°C	1243		
Hemispherical	°C	1374		
Fluid	°C	1418		

Notes: Whitewood Mine is owned by TransAlta Utilities Corp. and operated by Manalta Coal Ltd.

MANALTA COAL LIMITED
Whitewood Mine (Mine No. 1757); Seam No. 1; Wabamun Coalfield
Wabamun, Plains Region, Alberta

Sampling date	29-6-82
Sampling location	Mine (N.E. Qtr. Sec. 16, Twp. 53; R4, W5)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3645-82
Ash analysis, %:	
SiO_2	59.10
Al_2O_3	15.16
Fe_2O_3	4.88
Mn_3O_4	-
TiO_2	0.43
P_2O_5	0.10
CaO	10.18
MgO	2.59
SO_3	3.70
Na_2O	0.44
K_2O	0.94
SrO	0.04
BaO	0.19
Loss on fusion (LOF)	1.54
Volatile trace element analysis µg/g (ppm)	
Hg	0.05
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Whitewood Mine (Mine No. 1757); Seam No. 2; Wabamun Coalfield
Wabamun, Plains Region, Alberta

Sampling date		30-6-82	
Sampling location		Mine (N.E. Qtr. Sec. 16, Twp. 53; R4, W5)	
Product name		Mine Run	
Screen opening, mm			
(Screen opening, in)			
ERL number		3636-82	
Rank of coal		Subbituminous C	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	19.26		
Ash	%	19.86	24.60	
Volatile	%	25.85	32.02	42.47
Fixed carbon	%	35.03	43.38	57.53
Ultimate:				
Carbon	%	44.88	55.58	73.71
Hydrogen	%	2.92	3.62	4.80
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.37	0.46	-
Nitrogen	%	0.65	0.80	1.06
Ash	%	19.86	24.60	-
Oxygen, by difference	%	12.06	14.94	19.81
Heating value:				
	MJ/kg	17.11	21.19	28.10
	kcal/kg	4085	5060	6711
	Btu/lb	7354	9108	12,080
Hardgrove grindability index		44		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1193		
Spherical	°C	1268		
Hemispherical	°C	1368		
Fluid	°C	1388		

Notes: Whitewood Mine is owned by TransAlta Utilities Corp. and operated by Manalta Coal Ltd.

MANALTA COAL LIMITED
Whitewood Mine (Mine No. 1757); Seam No. 2; Wabamun Coalfield
Wabamun, Plains Region, Alberta

Sampling date	30-6-82
Sampling location	Mine (N.E. Qtr. Sec. 16, Twp. 53; R4, W5)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3636-82
Ash analysis, %:	
SiO_2	62.19
Al_2O_3	16.76
Fe_2O_3	3.34
Mn_3O_4	-
TiO_2	0.55
P_2O_5	-
CaO	7.63
MgO	1.69
SO_3	3.13
Na_2O	0.47
K_2O	1.41
SrO	0.05
BaO	0.36
Loss on fusion (LOF)	3.08
Volatile trace element analysis µg/g (ppm)	
Hg	0.08
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Whitewood Mine (Mine No. 1757); Seam No. 3; Wabamun Coalfield
Wabamun, Plains Region, Alberta

Sampling date		30-6-82	
Sampling location		Mine (N.E. Qtr. Sec. 16, Twp. 53; R4, W5)	
Product name		Mine Run	
Screen opening, mm (Screen opening, in)			
ERL number		3643-82	
Rank of coal		Subbituminous B	
Proximate analysis:		**As Rec'd**	**Dry**	**Dry Ash Free**
Equilibrium moisture	%	19.67		
Ash	%	11.82	14.71	
Volatile	%	31.15	38.78	45.47
Fixed carbon	%	37.36	46.51	54.53
Ultimate:				
Carbon	%	49.26	61.33	71.91
Hydrogen	%	3.12	3.88	4.55
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.22	0.27	-
Nitrogen	%	0.79	0.98	1.15
Ash	%	11.82	14.71	-
Oxygen, by difference	%	15.12	18.83	22.08
Heating value:				
	MJ/kg	19.13	23.81	27.92
	kcal/kg	4568	5686	6667
	Btu/lb	8222	10,235	12,000
Hardgrove grindability index		41		
Free swelling index (FSI)		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		**Reducing**		**Oxidizing**
Initial	°C	1324		
Spherical	°C	1360		
Hemispherical	°C	1393		
Fluid	°C	1418		

Notes: Whitewood Mine is owned by TransAlta Utilities Corp. and operated by Manalta Coal Ltd.

MANALTA COAL LIMITED
Whitewood Mine (Mine No. 1757); Seam No. 3; Wabamun Coalfield
Wabamun, Plains Region, Alberta

Sampling date	30-6-82
Sampling location	Mine (N.E. Qtr. Sec. 16, Twp. 53; R4, W5)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3643-82
Ash analysis, %:	
SiO_2	43.27
Al_2O_3	25.32
Fe_2O_3	3.85
Mn_3O_4	-
TiO_2	1.12
P_2O_5	0.07
CaO	17.03
MgO	2.45
SO_3	3.71
Na_2O	0.10
K_2O	0.20
SrO	0.08
BaO	0.33
Loss on fusion (LOF)	1.51
Volatile trace element analysis µg/g (ppm)	
Hg	0.03
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Whitewood Mine (Mine No. 1757); Seam No. 4; Wabamun Coalfield
Wabamun, Plains Region, Alberta

Sampling date			30-6-82	
Sampling location			Mine (N.E. Qtr. Sec. 16, Twp. 53; R4, W5)	
Product name			Mine Run	
Screen opening, mm				
(Screen opening, in)				
ERL number			3647-82	
Rank of coal			Subbituminous B	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	17.59		
Ash	%	19.92	24.17	
Volatile	%	26.35	31.98	42.17
Fixed carbon	%	36.14	43.85	57.83
Ultimate:				
Carbon	%	45.94	55.74	73.51
Hydrogen	%	2.83	3.44	4.54
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.44	0.53	-
Nitrogen	%	0.60	0.73	0.96
Ash	%	19.92	24.17	-
Oxygen, by difference	%	12.68	15.39	20.30
Heating value:				
	MJ/kg	17.43	21.15	27.89
	kcal/kg	4163	5052	6662
	Btu/lb	7494	9093	11,991
Hardgrove grindability index		41		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1243		
Spherical	°C	1341		
Hemispherical	°C	1421		
Fluid	°C	1460		

Notes: Whitewood Mine is owned by TransAlta Utilities Corp. and operated by Manalta Coal Ltd.

MANALTA COAL LIMITED
Whitewood Mine (Mine No. 1757); Seam No. 4; Wabamun Coalfield
Wabamun, Plains Region, Alberta

Sampling date	30-6-82
Sampling location	Mine (N.E. Qtr. Sec. 16, Twp. 53; R4, W5)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3647-82
Ash analysis, %:	
SiO_2	70.72
Al_2O_3	9.36
Fe_2O_3	3.54
Mn_3O_4	-
TiO_2	0.35
P_2O_5	0.21
CaO	7.60
MgO	0.93
SO_3	5.14
Na_2O	0.22
K_2O	0.57
SrO	-
BaO	-
Loss on fusion (LOF)	0.98
Volatile trace element analysis µg/g (ppm)	
Hg	0.25
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Whitewood Mine (Mine No. 1757); Seam No. 5; Wabamun Coalfield
Wabamun, Plains Region, Alberta

Sampling date		30-6-82	
Sampling location		Mine (N.E. Qtr. Sec. 16, Twp. 53; R4, W5)	
Product name		Mine Run	
Screen opening, mm			
(Screen opening, in)			
ERL number		3648-82	
Rank of coal		Subbituminous B	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	18.68		
Ash	%	18.21	22.39	
Volatile	%	25.92	31.88	41.08
Fixed carbon	%	37.19	45.73	58.92
Ultimate:				
Carbon	%	45.99	56.55	72.86
Hydrogen	%	2.68	3.30	4.25
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.25	0.31	-
Nitrogen	%	0.71	0.87	1.12
Ash	%	18.21	22.39	-
Oxygen, by difference	%	13.48	16.58	21.36
Heating value:				
	MJ/kg	17.61	21.65	27.90
	kcal/kg	4206	5172	6664
	Btu/lb	7571	9310	11,996
Hardgrove grindability index		48		
Free swelling index (FSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1224		
Spherical	°C	1288		
Hemispherical	°C	1399		
Fluid	°C	1446		

Notes: Whitewood Mine is owned by TransAlta Utilities Corp. and operated by Manalta Coal Ltd.

MANALTA COAL LIMITED
Whitewood Mine (Mine No. 1757); Seam No. 5; Wabamun Coalfield
Wabamun, Plains Region, Alberta

Sampling date	30-6-82
Sampling location	Mine (N.E. Qtr. Sec. 16, Twp. 53; R4, W5)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3648-82
Ash analysis, %:	
SiO_2	71.16
Al_2O_3	8.59
Fe_2O_3	2.10
Mn_3O_4	-
TiO_2	0.26
P_2O_5	0.12
CaO	11.31
MgO	1.20
SO_3	3.30
Na_2O	0.22
K_2O	0.20
SrO	-
BaO	-
Loss on fusion (LOF)	1.79
Volatile trace element analysis µg/g (ppm)	
Hg	0.02
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

MANALTA COAL LIMITED
Whitewood Mine (Mine No. 1757); Seam No. 6; Wabamun Coalfield
Wabamun, Plains Region, Alberta

Sampling date	30-6-82
Sampling location	Mine (N.E. Qtr. Sec. 16, Twp. 53; R4, W5)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3644-82

Rank of coal ..... Subbituminous B

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	17.67		
Ash	%	22.73	27.61	
Volatile	%	28.22	34.28	47.35
Fixed carbon	%	31.38	38.11	52.65
Ultimate:				
Carbon	%	43.69	53.07	73.31
Hydrogen	%	2.91	3.54	4.89
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.34	0.41	-
Nitrogen	%	0.62	0.75	1.04
Ash	%	22.73	27.61	-
Oxygen, by difference	%	12.04	14.62	20.20
Heating value:				
	MJ/kg	16.95	20.59	28.44
	kcal/kg	4048	4917	6792
	Btu/lb	7286	8850	12,225

Hardgrove grindability index		39
Free swelling index (FSI) ..		N/A
Moisture (as rec'd)		
Inherent	%	
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1293	
Spherical	°C	1318	
Hemispherical	°C	1424	
Fluid	°C	1452	

Notes: Whitewood Mine is owned by TransAlta Utilities Corp. and operated by Manalta Coal Ltd.

MANALTA COAL LIMITED
Whitewood Mine (Mine No. 1757); Seam No. 6; Wabamun Coalfield
Wabamun, Plains Region, Alberta

Sampling date	30-6-82
Sampling location	Mine (N.E. Qtr. Sec. 16, Twp. 53; R4, W5)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3644-82
Ash analysis, %:	
SiO_2	66.83
Al_2O_3	16.32
Fe_2O_3	1.27
Mn_3O_4	-
TiO_2	0.77
P_2O_5	0.07
CaO	7.74
MgO	1.19
SO_3	2.53
Na_2O	0.44
K_2O	0.37
SrO	0.07
BaO	0.40
Loss on fusion (LOF)	1.52
Volatile trace element analysis µg/g (ppm)	
Hg	0.03
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

COAL ANALYSES - ALBERTA FOOTHILLS AND MOUNTAIN REGIONS

LUSCAR STERCO LIMITED
Coal Valley Mine (Mine No. 1778); Coalspur Coalfield
Edson, Foothills Region, Alberta

Sampling date		25-6-82
Sampling location		Clean Coal Stockpile
Product name		Clean Coal
Screen opening, mm (Screen opening, in)		
ERL number		3626-82

Rank of coal ..... High-volatile C bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	9.22		
Ash	%	9.50	10.47	
Volatile	%	31.23	34.40	38.42
Fixed carbon	%	50.05	55.13	61.58
Ultimate:				
Carbon	%	64.32	70.85	79.14
Hydrogen	%	4.08	4.49	5.02
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.24	0.26	-
Nitrogen	%	0.93	1.03	1.15
Ash	%	9.50	10.47	-
Oxygen, by difference	%	11.71	12.90	14.41
Heating value:				
	MJ/kg	25.44	28.02	31.30
	kcal/kg	6075	6692	7475
	Btu/lb	10,935	12,046	13,455

Hardgrove grindability index		45
Free swelling index (FSI) ..		N/A
Moisture (as rec'd)		
Inherent	%	
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1196	
Spherical	°C	1266	
Hemispherical	°C	1379	
Fluid	°C	1435	

Notes:

LUSCAR STERCO LIMITED
Coal Valley Mine (Mine No. 1778); Coalspur Coalfield
Edson, Foothills Region, Alberta

Sampling date	25-6-82
Sampling location	Clean Coal Stockpile
Product name	Clean Coal
Screen opening, mm (Screen opening, in)	
ERL number	3626-82
Ash analysis, %:	
SiO_2	58.04
Al_2O_3	15.95
Fe_2O_3	5.45
Mn_3O_4	-
TiO_2	0.60
P_2O_5	0.36
CaO	9.95
MgO	1.40
SO_3	3.55
Na_2O	0.35
K_2O	0.38
SrO	0.10
BaO	0.17
Loss on fusion (LOF)	1.85
Volatile trace element analysis µg/g (ppm)	
Hg	0.02
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

LUSCAR STERCO LIMITED
Val-d'Or Pit (Mine No. 1778/2.1); Coal Valley Mine
Val-d'Or Seam; Coalspur Coalfield; Foothills Region
Edson, Alberta

Sampling date		25-6-82
Sampling location		Mine (Surface)
Product name		Mine Run
Screen opening, mm (Screen opening, in)		
ERL number		3628-82

Rank of coal ..... High-volatile C bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	9.09		
Ash	%	24.43	26.87	
Volatile	%	28.01	30.81	42.13
Fixed carbon	%	38.47	42.32	57.87
Ultimate:				
Carbon	%	49.45	54.40	74.39
Hydrogen	%	3.34	3.67	5.02
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.20	0.22	-
Nitrogen	%	0.55	0.61	0.83
Ash	%	24.43	26.87	-
Oxygen, by difference	%	12.94	14.23	19.46
Heating value:				
	MJ/kg	20.28	22.31	30.51
	kcal/kg	4846	5330	7288
	Btu/lb	8721	9593	13,118

Hardgrove grindability index		46
Free swelling index (FSI) ..		N/A
Moisture (as rec'd)		
Inherent	%	
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1227	
Spherical	°C	1279	
Hemispherical	°C	1371	
Fluid	°C	1410	

Notes:

LUSCAR STERCO LIMITED
Val-d'Or Pit (Mine No. 1778/2.1); Coal Valley Mine
Val-d'Or Seam; Coalspur Coalfield; Foothills Region
Edson, Alberta

Sampling date	25-6-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3628-82
Ash analysis, %:	
SiO_2	61.34
Al_2O_3	19.72
Fe_2O_3	3.65
Mn_3O_4	-
TiO_2	0.49
P_2O_5	0.12
CaO	6.13
MgO	1.75
SO_3	1.23
Na_2O	1.11
K_2O	1.31
SrO	0.07
BaO	0.30
Loss on fusion (LOF)	1.80
Volatile trace element analysis µg/g (ppm)	
Hg	0.04
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

LUSCAR STERCO LIMITED
Mynheer A Pit (Mine No. 1778/1.4); Coal Valley Mine
Mynheer A Seam; Coalspur Coalfield; Foothills Region
Edson, Alberta

Sampling date		25-6-82	
Sampling location		Mine (Surface)	
Product name		Mine Run	
Screen opening, mm			
(Screen opening, in)			
ERL number		3631-82	
Rank of coal		High-volatile C bituminous	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	9.01		
Ash	%	21.08	23.17	
Volatile	%	28.13	30.92	40.24
Fixed carbon	%	41.78	45.91	59.76
Ultimate:				
Carbon	%	54.13	59.49	77.43
Hydrogen	%	3.44	3.78	4.92
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.23	0.25	-
Nitrogen	%	0.66	0.73	0.95
Ash	%	21.08	23.17	-
Oxygen, by difference	%	11.45	12.58	16.37
Heating value:				
	MJ/kg	21.17	23.27	30.29
	kcal/kg	5056	5557	7233
	Btu/lb	9102	10,003	13,020
Hardgrove grindability index		58		
Free swelling index (PSI) ..		N/A		
Moisture (as rec'd)				
Inherent	%			
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1229		
Spherical	°C	1277		
Hemispherical	°C	1299		
Fluid	°C	1407		

Notes:

LUSCAR STERCO LIMITED
Mynheer A Pit (Mine No. 1778/1.4); Coal Valley Mine
Mynheer A Seam; Coalspur Coalfield; Foothills Region
Edson, Alberta

Sampling date	25-6-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3631-82
Ash analysis, %:	
SiO_2	54.52
Al_2O_3	19.21
Fe_2O_3	3.70
Mn_3O_4	-
TiO_2	0.71
P_2O_5	0.09
CaO	12.22
MgO	1.23
SO_3	1.57
Na_2O	0.80
K_2O	0.66
SrO	0.05
BaO	0.11
Loss on fusion (LOF)	3.31
Volatile trace element analysis µg/g (ppm)	
Hg	0.03
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

LUSCAR STERCO LIMITED
Silkstone Pit (Mine No. 1796/E); Coal Valley Mine
Silkstone Seam; Coalspur Coalfield; Foothills Region
Edson, Alberta

Sampling date	25-6-82
Sampling location	Mine (Underground)
Product name	Mine Run
Screen opening, mm	
(Screen opening, in)	
ERL number	3637-82

Rank of coal ..... High-volatile C bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	10.31		
Ash	%	14.06	15.68	
Volatile	%	27.29	30.43	36.09
Fixed carbon	%	48.34	53.89	63.91
Ultimate:				
Carbon	%	60.07	66.98	79.44
Hydrogen	%	3.70	4.12	4.89
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.21	0.23	-
Nitrogen	%	0.95	1.06	1.26
Ash	%	14.06	15.68	-
Oxygen, by difference	%	10.70	11.93	14.15
Heating value:				
	MJ/kg	23.46	26.16	31.02
	kcal/kg	5604	6248	7410
	Btu/lb	10,087	11,247	13,338

Hardgrove grindability index	68	
Free swelling index (FSI) ..	N/A	
Moisture (as rec'd)		
Inherent	%	
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1221	
Spherical	°C	1279	
Hemispherical	°C	1299	
Fluid	°C	1366	

Notes:

LUSCAR STERCO LIMITED
Silkstone Pit (Mine No. 1796/E); Coal Valley Mine
Silkstone Seam; Coalspur Coalfield; Foothills Region
Edson, Alberta

Sampling date	25-6-82
Sampling location	Mine (Underground)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3637-82
Ash analysis, %:	
SiO_2	55.48
Al_2O_3	22.27
Fe_2O_3	6.63
Mn_3O_4	-
TiO_2	0.63
P_2O_5	-
CaO	8.41
MgO	1.37
SO_3	1.74
Na_2O	0.27
K_2O	0.80
SrO	0.15
BaO	0.10
Loss on fusion (LOF)	1.98
Volatile trace element analysis µg/g (ppm)	
Hg	0.01
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CARDINAL RIVER COALS LIMITED
Luscar Mine (Mine No. 1768); Cadomin-Luscar Coalfield
Hinton, Mountain Region, Alberta

Sampling date		24-6-82	
Sampling location		Clean Coal Stockpile	
Product name		Clean Coal	
Screen opening, mm			
(Screen opening, in)			
ERL number		3640-82	
Rank of coal		Low-volatile bituminous	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.11		
Ash	%	9.65	9.76	
Volatile	%	19.88	20.10	22.27
Fixed carbon	%	69.36	70.14	77.73
Ultimate:				
Carbon	%	80.08	80.98	89.74
Hydrogen	%	4.14	4.19	4.64
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.29	0.29	-
Nitrogen	%	1.23	1.24	1.37
Ash	%	9.65	9.76	-
Oxygen, by difference	%	3.50	3.54	3.92
Heating value:				
	MJ/kg	32.20	32.56	36.08
	kcal/kg	7690	7776	8617
	Btu/lb	13,842	13,997	15,511
Hardgrove grindability index		84		
Free swelling index (FSI) ..		2 1/2		
Moisture (as rec'd)				
Inherent	%	1.11		
Adherent	%			
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1213		
Spherical	°C	1285		
Hemispherical	°C	1360		
Fluid	°C	1432		

Notes: Cardinal River Coals Ltd. is a joint venture of Luscar Ltd. and Consolidation Coal Co. of Canada.

CARDINAL RIVER COALS LIMITED
Luscar Mine (Mine No. 1768); Cadomin-Luscar Coalfield
Hinton, Mountain Region, Alberta

Sampling date	24-6-82
Sampling location	Clean Coal stockpile
Product name	Clean Coal
Screen opening, mm (Screen opening, in)	
ERL number	3640-82
Ash analysis, %:	
SiO_2	51.94
Al_2O_3	20.94
Fe_2O_3	3.46
Mn_3O_4	-
TiO_2	0.28
P_2O_5	0.58
CaO	10.57
MgO	2.10
SO_3	4.49
Na_2O	1.27
K_2O	0.69
SrO	0.34
BaO	0.95
Loss on fusion (LOF)	2.44
Volatile trace element analysis µg/g (ppm)	
Hg	0.05
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CARDINAL RIVER COALS LIMITED
Luscar Mine (Mine No. 1768); Jewel Seam; Cadomin-Luscar Coalfield
Hinton, Mountain Region, Alberta

Sampling date		24-6-82
Sampling location		Pit B2 (Surface)
Product name		Mine Run
Screen opening, mm		
(Screen opening, in)		
ERL number		3616-82

Rank of coal ..... Low-volatile bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.06		
Ash	%	18.89	19.09	
Volatile	%	18.54	18.74	23.16
Fixed carbon	%	61.51	62.17	76.84
Ultimate:				
Carbon	%	72.44	73.22	90.50
Hydrogen	%	3.81	3.85	4.76
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.22	0.22	-
Nitrogen	%	1.10	1.11	1.37
Ash	%	18.89	19.09	-
Oxygen, by difference	%	2.48	2.51	3.10
Heating value:				
	MJ/kg	28.62	28.93	35.76
	kcal/kg	6836	6909	8539
	Btu/lb	12,305	12,437	15,371

Hardgrove grindability index		90
Free swelling index (FSI) ..		2 1/2
Moisture (as rec'd)		
Inherent	%	1.06
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1263	
Spherical	°C	1302	
Hemispherical	°C	1402	
Fluid	°C	1418	

Notes: Cardinal River Coals Ltd. is a joint venture of Luscar Ltd. and Consolidation Coal Co. of Canada.

CARDINAL RIVER COALS LIMITED
Luscar Mine (Mine No. 1768); Jewel Seam; Cadomin-Luscar Coalfield
Hinton, Mountain Region, Alberta

Sampling date	24-6-82
Sampling location	Pit B2 (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3616-82
Ash analysis, %:	
SiO_2	55.04
Al_2O_3	23.61
Fe_2O_3	5.32
Mn_3O_4	-
TiO_2	0.74
P_2O_5	0.46
CaO	5.42
MgO	1.67
SO_3	2.29
Na_2O	1.57
K_2O	0.74
SrO	0.12
BaO	0.58
Loss on fusion (LOF)	1.88
Volatile trace element analysis µg/g (ppm)	
Hg	0.18
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CARDINAL RIVER COALS LIMITED
Luscar Mine (Mine No. 1768); Jewel Seam; Cadomin-Luscar Coalfield
Hinton, Mountain Region, Alberta

Sampling date		24-6-82
Sampling location		Pit C3 (Surface)
Product name		Mine Run
Screen opening, mm		
(Screen opening, in)		
ERL number		3638-82

Rank of coal ..... Medium-volatile bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.18		
Ash	%	30.10	30.46	
Volatile	%	18.49	18.71	26.91
Fixed carbon	%	50.23	50.83	73.09
Ultimate:				
Carbon	%	61.20	61.93	89.06
Hydrogen	%	3.52	3.56	5.12
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.16	0.16	-
Nitrogen	%	1.01	1.02	1.47
Ash	%	30.10	30.46	-
Oxygen, by difference	%	2.83	2.87	4.13
Heating value:				
	MJ/kg	23.92	24.21	34.81
	kcal/kg	5714	5782	8315
	Btu/lb	10,285	10,408	14,967

Hardgrove grindability index		86
Free swelling index (FSI) ..		1 1/2
Moisture (as rec'd)		
Inherent	%	1.18
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1482+	
Spherical	°C	1482+	
Hemispherical	°C	1482+	
Fluid	°C	1482+	

Notes: Cardinal River Coals Ltd. is a joint venture of Luscar Ltd. and Consolidation Coal Co. of Canada.

CARDINAL RIVER COALS LIMITED
Luscar Mine (Mine No. 1768); Jewel Seam; Cadomin-Luscar Coalfield
Hinton, Mountain Region, Alberta

Sampling date	24-6-82
Sampling location	Pit C3 (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3638-82
Ash analysis, %:	
SiO_2	58.24
Al_2O_3	28.97
Fe_2O_3	2.36
Mn_3O_4	-
TiO_2	0.87
P_2O_5	0.12
CaO	3.40
MgO	0.92
SO_3	1.37
Na_2O	0.90
K_2O	1.43
SrO	0.06
BaO	0.30
Loss on fusion (LOF)	1.37
Volatile trace element analysis µg/g (ppm)	
Hg	0.20
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

SMOKY RIVER COAL LIMITED
Underground & Surface Mines; Various Seams; Smoky River Coalfield
Grand Cache, Mountain Region, Alberta

Sampling date		22-6-82
Sampling location		Clean Coal Stockpile
Product name		Clean Coal
Screen opening, mm (Screen opening, in)		
ERL number		3617-82

Rank of coal ..... Low-volatile bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	0.89		
Ash	%	7.64	7.71	
Volatile	%	17.32	17.48	18.94
Fixed carbon	%	74.15	74.81	81.06
Ultimate:				
Carbon	%	84.57	85.33	92.46
Hydrogen	%	4.26	4.30	4.66
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.39	0.39	-
Nitrogen	%	1.30	1.31	1.42
Ash	%	7.64	7.71	-
Oxygen, by difference	%	0.95	0.96	1.04
Heating value:				
	MJ/kg	33.27	33.57	36.37
	kcal/kg	7946	8017	8687
	Btu/lb	14,303	14,431	15,637

Hardgrove grindability index		90
Free swelling index (FSI) ..		4 1/2
Moisture (as rec'd)		
Inherent	%	0.89
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1482+	
Spherical	°C	1482+	
Hemispherical	°C	1482+	
Fluid	°C	1482+	

Notes: Smoky River Coal Ltd. is a subsidiary of McIntyre Mines Ltd.

SMOKY RIVER COAL LIMITED
Underground & Surface Mines; Various Seams; Smoky River Coalfield
Grand Cache, Mountain Region, Alberta

Sampling date	22-6-82
Sampling location	Clean Coal Stockpile
Product name	Clean Coal
Screen opening, mm (Screen opening, in)	
ERL number	3617-82
Ash analysis, %:	
SiO_2	54.40
Al_2O_3	28.84
Fe_2O_3	3.46
Mn_3O_4	-
TiO_2	1.37
P_2O_5	1.17
CaO	3.66
MgO	-
SO_3	1.67
Na_2O	1.23
K_2O	0.63
SrO	0.24
BaO	0.70
Loss on fusion (LOF)	1.84
Volatile trace element analysis µg/g (ppm)	
Hg	0.07
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

SMOKY RIVER COAL LIMITED
Underground & Surface Mines; Various Seams; Smoky River Coalfield
Grand Cache, Mountain Region, Alberta

Sampling date	22-6-82
Sampling location	Clean Coal Stockpile
Product name	Clean Coal
Screen opening, mm	
(Screen opening, in)	
ERL number	3624-82

Rank of coal ..... Low-volatile bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.07		
Ash	%	7.90	7.99	
Volatile	%	16.84	17.02	18.50
Fixed carbon	%	74.19	74.99	81.50
Ultimate:				
Carbon	%	83.00	83.90	91.19
Hydrogen	%	4.13	4.17	4.53
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.38	0.38	-
Nitrogen	%	1.07	1.08	1.17
Ash	%	7.90	7.99	-
Oxygen, by difference	%	2.45	2.48	2.70
Heating value:				
	MJ/kg	33.03	33.38	36.28
	kcal/kg	7888	7973	8665
	Btu/lb	14,198	14,352	15,598

Hardgrove grindability index	93	
Free swelling index (FSI) ..	5 1/2	
Moisture (as rec'd)		
Inherent	%	1.07
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1371	
Spherical	°C	1482+	
Hemispherical	°C	1482+	
Fluid	°C	1482+	

Notes: Smoky River Coal Ltd. is a subsidiary of McIntyre Mines Ltd.

SMOKY RIVER COAL LIMITED
Underground & Surface Mines; Various Seams; Smoky River Coalfield
Grand Cache, Mountain Region, Alberta

Sampling date	22-6-82
Sampling location	Clean Coal Stockpile
Product name	Clean Coal
Screen opening, mm (Screen opening, in)	
ERL number	3624-82
Ash analysis, %:	
SiO_2	54.19
Al_2O_3	28.58
Fe_2O_3	3.54
Mn_3O_4	-
TiO_2	1.45
P_2O_5	1.04
CaO	3.71
MgO	0.61
SO_3	2.37
Na_2O	1.13
K_2O	0.65
SrO	0.22
BaO	0.57
Loss on fusion (LOF)	1.71
Volatile trace element analysis µg/g (ppm)	
Hg	0.04
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

SMOKY RIVER COAL LIMITED
No. 9 Mine (Mine No. 1774); Seam No. 4; Smoky River Coalfield
Grand Cache, Mountain Region, Alberta

Sampling date		22-6-82
Sampling location		Mine (Surface)
Product name		Mine Run
Screen opening, mm		
(Screen opening, in)		
ERL number		3615-82

Rank of coal ..... Low-volatile bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	0.92		
Ash	%	19.46	19.64	
Volatile	%	15.54	15.68	19.51
Fixed carbon	%	64.08	64.68	80.49
Ultimate:				
Carbon	%	73.72	74.40	92.58
Hydrogen	%	3.80	3.84	4.78
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.58	0.59	-
Nitrogen	%	1.06	1.07	1.33
Ash	%	19.46	19.64	-
Oxygen, by difference	%	0.46	0.46	0.57
Heating value:				
	MJ/kg	28.76	29.03	36.12
	kcal/kg	6870	6934	8629
	Btu/lb	12,366	12,481	15,531

Hardgrove grindability index		123
Free swelling index (FSI) ..		3
Moisture (as rec'd)		
Inherent	%	0.92
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1424	
Spherical	°C	1482+	
Hemispherical	°C	1482+	
Fluid	°C	1482+	

Notes: Smoky River Coal Ltd. is a subsidiary of McIntyre Mines Ltd.

SMOKY RIVER COAL LIMITED
No. 9 Mine (Mine No. 1774); Seam No. 4; Smoky River Coalfield
Grand Cache, Mountain Region, Alberta

Sampling date	22-6-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3615-82
Ash analysis, %:	
SiO_2	66.16
Al_2O_3	23.10
Fe_2O_3	3.19
Mn_3O_4	-
TiO_2	0.95
P_2O_5	0.33
CaO	1.24
MgO	0.64
SO_3	0.42
Na_2O	0.23
K_2O	2.19
SrO	0.04
BaO	0.27
Loss on fusion (LOF)	1.21
Volatile trace element analysis µg/g (ppm)	
Hg	0.12
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

SMOKY RIVER COAL LIMITED
No. 9 Mine (Mine No. 1774); Seam No. 10; Smoky River Coalfield
Grand Cache, Mountain Region, Alberta

Sampling date		22-6-82
Sampling location		Mine (Surface)
Product name		Mine Run
Screen opening, mm (Screen opening, in)		
ERL number		3625-82

Rank of coal ..... Low-volatile bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.01		
Ash	%	13.83	13.97	
Volatile	%	17.62	17.80	20.69
Fixed carbon	%	67.54	68.23	79.31
Ultimate:				
Carbon	%	79.60	80.41	93.47
Hydrogen	%	4.03	4.07	4.73
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.30	0.30	-
Nitrogen	%	0.96	0.97	1.13
Ash	%	13.83	13.97	-
Oxygen, by difference	%	0.27	0.28	0.33
Heating value:				
	MJ/kg	30.95	31.26	36.34
	kcal/kg	7392	7467	8680
	Btu/lb	13,306	13,441	15,624

Hardgrove grindability index		89
Free swelling index (FSI) ..		5
Moisture (as rec'd)		
Inherent	%	1.01
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1241	
Spherical	°C	1282	
Hemispherical	°C	1413	
Fluid	°C	1429	

Notes: Smoky River Coal Ltd. is a subsidiary of McIntyre Mines Ltd.

SMOKY RIVER COAL LIMITED
No. 9 Mine (Mine No. 1774); Seam No. 10; Smoky River Coalfield
Grand Cache, Mountain Region, Alberta

Sampling date	22-6-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3625-82
Ash analysis, %:	
SiO_2	55.74
Al_2O_3	18.58
Fe_2O_3	5.77
Mn_3O_4	-
TiO_2	0.89
P_2O_5	1.41
CaO	6.69
MgO	1.87
SO_3	3.29
Na_2O	0.85
K_2O	0.88
SrO	0.19
BaO	0.55
Loss on fusion (LOF)	1.85
Volatile trace element analysis µg/g (ppm)	
Hg	0.02
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

SMOKY RIVER COAL LIMITED
No. 9 Mine (Mine No. 1774); Seam No. 11; Smoky River Coalfield
Grand Cache, Mountain Region, Alberta

Sampling date		22-6-82
Sampling location		Mine (Surface)
Product name		Mine Run
Screen opening, mm		
(Screen opening, in)		
ERL number		3630-82

Rank of coal ..... Low-volatile bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.41		
Ash	%	62.89	63.79	
Volatile	%	11.21	11.37	31.40
Fixed carbon	%	24.49	24.84	68.60
Ultimate:				
Carbon	%	29.70	30.02	82.91
Hydrogen	%	1.86	1.89	5.22
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	1.22	1.24	-
Nitrogen	%	0.40	0.41	1.13
Ash	%	62.89	63.79	-
Oxygen, by difference	%	2.52	2.55	7.04
Heating value:				
	MJ/kg	11.02	11.17	30.85
	kcal/kg	2631	2669	7371
	Btu/lb	4736	4804	15,267

Hardgrove grindability index		69
Free swelling index (FSI) ..		N/A
Moisture (as rec'd)		
Inherent	%	1.41
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1254	
Spherical	°C	1321	
Hemispherical	°C	1482+	
Fluid	°C	1482+	

Notes: Smoky River Coal Ltd. is a subsidiary of McIntyre Mines Ltd.

SMOKY RIVER COAL LIMITED
No. 9 Mine (Mine No. 1774); Seam No. 11; Smoky River Coalfield
Grand Cache, Mountain Region, Alberta

Sampling date	22-6-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3630-82
Ash analysis, %:	
SiO_2	61.27
Al_2O_3	21.97
Fe_2O_3	6.06
Mn_3O_4	-
TiO_2	0.73
P_2O_5	0.03
CaO	0.56
MgO	2.01
SO_3	0.57
Na_2O	0.49
K_2O	3.76
SrO	0.02
BaO	0.45
Loss on fusion (LOF)	0.67
Volatile trace element analysis µg/g (ppm)	
Hg	0.13
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

SMOKY RIVER COAL LIMITED
Mine 9 G-4 (Mine No. 1765/09/G); Seam No. 4; Smoky River Coalfield
Grand Cache, Mountain Region, Alberta

Sampling date	22-6-82
Sampling location	Mine (Underground)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3618-82

Rank of coal ..... Low-volatile bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	0.88		
Ash	%	12.55	12.66	
Volatile	%	16.85	17.00	19.46
Fixed carbon	%	69.72	70.34	80.54
Ultimate:				
Carbon	%	78.76	79.46	90.98
Hydrogen	%	3.91	3.94	4.51
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.28	0.28	-
Nitrogen	%	1.09	1.10	1.26
Ash	%	12.55	12.66	-
Oxygen, by difference	%	2.53	2.56	2.93
Heating value:				
	MJ/kg	31.11	31.38	35.93
	kcal/kg	7430	7496	8583
	Btu/lb	13,374	13,493	15,449

Hardgrove grindability index		85
Free swelling index (FSI) ..		3 1/2
Moisture (as rec'd)		
Inherent	%	0.88
Adherent	%	

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1427	
Spherical	°C	1482+	
Hemispherical	°C	1482+	
Fluid	°C	1482+	

Notes: Smoky River Coal Ltd. is a subsidiary of McIntyre Mines Ltd.

SMOKY RIVER COAL LIMITED
Mine 9 G-4 (Mine No. 1765/09/G); Seam No. 4; Smoky River Coalfield
Grand Cache, Mountain Region, Alberta

Sampling date	22-6-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	3618-82
Ash analysis, %:	
SiO_2	52.92
Al_2O_3	28.28
Fe_2O_3	2.29
Mn_3O_4	-
TiO_2	1.32
P_2O_5	1.11
CaO	5.41
MgO	0.56
SO_3	2.62
Na_2O	0.98
K_2O	3.89
SrO	0.20
BaO	0.42
Loss on fusion (LOF)	2.26
Volatile trace element analysis µg/g (ppm)	
Hg	0.04
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

COAL ANALYSES - BRITISH COLUMBIA

BYRON CREEK COLLIERIES LIMITED
Corbin Mine; Mammoth Seam; Crowsnest Coalfield
Corbin, British Columbia

Sampling date		24-9-82	
Sampling location		Coal Preparation plant	
Product name		Clean thermal coal	
Screen opening, mm (Screen opening, in)			
ERL number		4414-82	
Rank of coal		Medium-volatile bituminous	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	4.56		
Ash	%	13.07	13.69	
Volatile	%	21.49	22.52	26.09
Fixed carbon	%	60.88	63.79	73.91
Ultimate:				
Carbon	%	69.51	72.83	84.38
Hydrogen	%	3.52	3.69	4.28
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.23	0.24	-
Nitrogen	%	1.17	1.23	1.43
Ash	%	13.07	13.69	-
Oxygen, by difference	%	7.94	8.32	9.64
Heating value:				
	MJ/kg	27.53	28.84	33.41
	kcal/kg	6575	6889	7982
	Btu/lb	11,835	12,400	14,367
Hardgrove grindability index		60		
Free swelling index (FSI) ..		NA		
Moisture (as rec'd)				
Inherent	%	2.50		
Adherent	%	2.06		
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1482+		
Spherical	°C	1482+		
Hemispherical	°C	1482+		
Fluid	°C	1482+		

Notes: Byron Creek Collieries Ltd. is a subsidiary of Esso Resources Canada Ltd.

BYRON CREEK COLLIERIES LIMITED
Corbin Mine; Mammoth Seam; Crowsnest Coalfield
Corbin, British Columbia

Sampling date	24-9-82
Sampling location	Coal Preparation Plant
Product name	Clean thermal coal
Screen opening, mm (Screen opening, in)	
ERL number	4414-82
Ash analysis, %:	
SiO_2	53.77
Al_2O_3	31.18
Fe_2O_3	1.98
Mn_3O_4	-
TiO_2	1.68
P_2O_5	0.30
CaO	3.29
MgO	0.65
SO_3	3.11
Na_2O	0.66
K_2O	0.48
SrO	0.11
BaO	0.67
Loss on fusion (LOF)	0.04
Volatile trace element analysis µg/g (ppm)	
Hg	0.04
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

BYRON CREEK COLLIERIES LIMITED
Corbin Mine; No. 3 Pit; Crowsnest Coalfield
Corbin, British Columbia

Sampling date		24-9-82	
Sampling location		No. 3 Pit (Surface)	
Product name		Mine Run	
Screen opening, mm (Screen opening, in)			
ERL number		4413-82	
Rank of coal		Medium-volatile bituminous	
Proximate analysis:		**As Rec'd**	**Dry**	**Dry Ash Free**
Moisture	%	5.06		
Ash	%	15.02	15.82	
Volatile	%	21.07	22.19	26.36
Fixed carbon	%	58.85	61.99	73.64
Ultimate:				
Carbon	%	69.61	73.32	87.10
Hydrogen	%	3.61	3.80	4.51
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.19	0.20	-
Nitrogen	%	1.30	1.37	1.63
Ash	%	15.02	15.82	-
Oxygen, by difference	%	5.21	5.49	6.52
Heating value:				
	MJ/kg	27.68	29.16	34.64
	kcal/kg	6612	6964	8273
	Btu/lb	11,902	12,536	14,892
Hardgrove grindability index		85		
Free swelling index (FSI) ..		1		
Moisture (as rec'd)				
Inherent	%	0.79		
Adherent	%	4.27		
Ash fusibility temperature:		**Reducing**		**Oxidizing**
Initial	°C	1446		
Spherical	°C	1482+		
Hemispherical	°C	1482+		
Fluid	°C	1482+		

Notes: Byron Creek Collieries Ltd. is a subsidiary of Esso Resources Canada Ltd.

BYRON CREEK COLLIERIES LIMITED
Corbin Mine; No. 3 Pit; Crowsnest Coalfield
Corbin, British Columbia

Sampling date	24-9-82
Sampling location	No. 3 Pit (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4413-82
Ash analysis, %:	
SiO_2	51.00
Al_2O_3	30.55
Fe_2O_3	3.80
Mn_3O_4	-
TiO_2	1.83
P_2O_5	-
CaO	4.19
MgO	2.08
SO_3	3.53
Na_2O	0.33
K_2O	0.35
SrO	0.04
BaO	-
Loss on fusion (LOF)	0.54
Volatile trace element analysis µg/g (ppm)	
Hg	0.03
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

BYRON CREEK COLLIERIES LIMITED
Corbin Mine; No. 34 Pit; Mammoth Seam; Crowsnest Coalfield
Corbin, British Columbia

Sampling date		24-9-82
Sampling location		No. 34 Pit (Surface)
Product name		Mine Run
Screen opening, mm (Screen opening, in)		
ERL number		4412-82
Rank of coal		Medium-volatile bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	2.46		
Ash	%	18.26	18.68	
Volatile	%	21.39	21.88	26.91
Fixed carbon	%	58.11	59.44	73.09
Ultimate:				
Carbon	%	69.67	71.27	87.64
Hydrogen	%	3.59	3.67	4.51
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.19	0.19	-
Nitrogen	%	0.95	0.97	1.19
Ash	%	18.26	18.68	-
Oxygen, by difference	%	5.10	5.22	6.42
Heating value:				
	MJ/kg	27.61	28.24	34.73
	kcal/kg	6595	6746	8296
	Btu/lb	11,871	12,143	14,932

Hardgrove grindability index		71
Free swelling index (FSI) ..		1 1/2
Moisture (as rec'd)		
Inherent	%	0.82
Adherent	%	1.42

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1332	
Spherical	°C	1379	
Hemispherical	°C	1402	
Fluid	°C	1454	

Notes: Byron Creek Collieries Ltd. is a subsidiary of Esso Resources Canada Ltd.

BYRON CREEK COLLIERIES LIMITED
Corbin Mine; No. 34 Pit; Crowsnest Coalfield
Corbin, British Columbia

Sampling date	24-9-82
Sampling location	No. 34 Pit (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4412-82
Ash analysis, %:	
SiO_2	54.84
Al_2O_3	25.17
Fe_2O_3	1.63
Mn_3O_4	-
TiO_2	1.18
P_2O_5	0.06
CaO	11.01
MgO	0.72
SO_3	2.97
Na_2O	0.31
K_2O	0.42
SrO	0.16
BaO	0.75
Loss on fusion (LOF)	0.83
Volatile trace element analysis µg/g (ppm)	
Hg	0.08
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

B.C. COAL LIMITED
Michel Underground Mine; 10 Seam (Balmer Seam); Crowsnest Coalfield
Sparwood, British Columbia

Sampling date		20-9-82	
Sampling location		Panel #6 (hydraulic mine)	
Product name		Mine Run	
Screen opening, mm			
(Screen opening, in)			
ERL number		4395-82	
Rank of coal		Low-volatile bituminous	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.80		
Ash	%	15.29	15.57	
Volatile	%	16.59	16.89	20.00
Fixed carbon	%	66.32	67.54	80.00
Ultimate:				
Carbon	%	75.49	76.87	91.05
Hydrogen	%	4.00	4.07	4.82
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.23	0.23	-
Nitrogen	%	1.60	1.63	1.93
Ash	%	15.29	15.57	-
Oxygen, by difference	%	1.59	1.63	1.93
Heating value:				
	MJ/kg	30.12	30.68	36.34
	kcal/kg	7195	7327	8678
	Btu/lb	12,951	13,188	15,620
Hardgrove grindability index		94		
Free swelling index (FSI) ..		NA		
Moisture (as rec'd)				
Inherent	%	0.55		
Adherent	%	1.25		
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1441		
Spherical	°C	1482+		
Hemispherical	°C	1482+		
Fluid	°C	1482+		

Notes: 1. B.C. Coal Ltd. is a subsidiary of British Columbia Resources Investment Corp.

2. 10 Seam has also been referred to as the Balmer Seam in some reports.

B.C. COAL LIMITED
Michel Underground Mine; 10 Seam (Balmer Seam); Crowsnest Coalfield
Sparwood, British Columbia

Sampling date	20-9-82
Sampling location	Panel #6 (hydraulic mine)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4395-82
Ash analysis, %:	
SiO_2	60.69
Al_2O_3	27.68
Fe_2O_3	3.59
Mn_3O_4	-
TiO_2	1.27
P_2O_5	0.74
CaO	2.37
MgO	0.23
SO_3	1.61
Na_2O	0.13
K_2O	0.08
SrO	0.02
BaO	-
Loss on fusion (LOF)	0.19
Volatile trace element analysis µg/g (ppm)	
Hg	0.05
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

B.C. COAL LIMITED
Harmer Surface Mine; 10 Seam (Balmer Seam); Crowsnest Coalfield
Sparwood, British Columbia

Sampling date	21-9-82
Sampling location	Adit #29 South
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4401-82

Rank of coal ..... Low-volatile bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.02		
Ash	%	14.32	14.47	
Volatile	%	18.27	18.46	21.58
Fixed carbon	%	66.39	67.07	78.42
Ultimate:				
Carbon	%	75.48	76.26	89.16
Hydrogen	%	3.96	4.00	4.68
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.27	0.27	-
Nitrogen	%	1.52	1.54	1.80
Ash	%	14.32	14.47	-
Oxygen, by difference	%	3.43	3.46	4.05
Heating value:				
	MJ/kg	30.36	30.68	35.87
	kcal/kg	7252	7327	8567
	Btu/lb	13,054	13,188	15,419

Hardgrove grindability index		102
Free swelling index (FSI) ..		NA
Moisture (as rec'd)		
Inherent	%	0.48
Adherent	%	0.54

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1471	
Spherical	°C	1482+	
Hemispherical	°C	1482+	
Fluid	°C	1482+	

Notes: 1. B.C. Coal Ltd. is a subsidiary of British Columbia Resources Investment Corp.

2. 10 Seam has also been referred to as the Balmer Seam in some reports.

B.C. COAL LIMITED
Harmer Surface Mine; 10 Seam (Balmer Seam); Crowsnest Coalfield
Sparwood, British Columbia

Sampling date	21-9-82
Sampling location	Adit #29 South
Product name	Mine Run
Screen opening, mm	
(Screen opening, in)	
ERL number	4401-82
Ash analysis, %:	
SiO_2	60.55
Al_2O_3	27.79
Fe_2O_3	2.45
Mn_3O_4	-
TiO_2	1.44
P_2O_5	1.16
CaO	2.46
MgO	0.19
SO_3	0.92
Na_2O	0.10
K_2O	0.82
SrO	0.03
BaO	-
Loss on fusion (LOF)	0.17
Volatile trace element analysis µg/g (ppm)	
Hg	0.02
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CROWS NEST RESOURCES LIMITED
Line Creek Mine; #6 Seam; Elk Valley Coalfield
Sparwood, British Columbia

Sampling date		22-9-82	
Sampling location		Mine (Surface)	
Product name		Mine Run	
Screen opening, mm			
(Screen opening, in)			
ERL number		4404-82	
Rank of coal		Low-volatile bituminous	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	4.16		
Ash	%	13.77	14.37	
Volatile	%	21.28	22.20	25.93
Fixed carbon	%	60.79	63.43	74.07
Ultimate:				
Carbon	%	72.04	75.17	87.78
Hydrogen	%	4.05	4.23	4.94
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.67	0.70	-
Nitrogen	%	1.03	1.07	1.25
Ash	%	13.77	14.37	-
Oxygen, by difference	%	4.28	4.46	5.21
Heating value:				
	MJ/kg	29.18	30.44	35.55
	kcal/kg	6969	7271	8491
	Btu/lb	12,544	13,089	15,286
Hardgrove grindability index		78		
Free swelling index (FSI) ..		8		
Moisture (as rec'd)				
Inherent	%	0.59		
Adherent	%	3.57		
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1482+		
Spherical	°C	1482+		
Hemispherical	°C	1482+		
Fluid	°C	1482+		

Notes: Crows Nest Resources Ltd. is a subsidiary of Shell Canada Resources

CROWS NEST RESOURCES LIMITED
Line Creek Mine; #6 Seam; Elk Valley Coalfield
Sparwood, British Columbia

Sampling date	22-9-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4404-82
Ash analysis, %:	
SiO_2	52.08
Al_2O_3	33.13
Fe_2O_3	4.68
Mn_3O_4	-
TiO_2	1.67
P_2O_5	1.67
CaO	2.43
MgO	0.41
SO_3	1.03
Na_2O	0.04
K_2O	0.64
SrO	0.09
BaO	-
Loss on fusion (LOF)	0.27
Volatile trace element analysis µg/g (ppm)	
Hg	0.03
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CROWS NEST RESOURCES LIMITED
Line Creek Mine; #7 Seam; Elk Valley Coalfield
Sparwood, British Columbia

Sampling date			22-9-82	
Sampling location			Mine (Surface)	
Product name			Mine Run	
Screen opening, mm				
(Screen opening, in)				
ERL number			4402-82	
Rank of coal			Low-volatile bituminous	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.57		
Ash	%	37.80	38.40	
Volatile	%	16.00	16.26	26.40
Fixed carbon	%	44.63	45.34	73.60
Ultimate:				
Carbon	%	50.00	50.80	82.47
Hydrogen	%	2.92	2.97	4.82
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.47	0.48	-
Nitrogen	%	1.37	1.39	2.26
Ash	%	37.80	38.40	-
Oxygen, by difference	%	5.87	5.96	9.68
Heating value:				
	MJ/kg	21.36	21.70	35.23
	kcal/kg	5101	5182	8412
	Btu/lb	9182	9328	15,143
Hardgrove grindability index		68		
Free swelling index (FSI) ..		NA		
Moisture (as rec'd)				
Inherent	%	0.60		
Adherent	%	0.97		
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1482+		
Spherical	°C	1482+		
Hemispherical	°C	1482+		
Fluid	°C	1482+		

Notes: Crows Nest Resources Ltd. is a subsidiary of Shell Canada Resources

CROWS NEST RESOURCES LIMITED
Line Creek Mine; #7 Seam; Elk Valley Coalfield
Sparwood, British Columbia

Sampling date	22-9-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4402-82
Ash analysis, %:	
SiO_2	66.58
Al_2O_3	26.27
Fe_2O_3	1.51
Mn_3O_4	-
TiO_2	1.33
P_2O_5	0.13
CaO	0.50
MgO	0.15
SO_3	0.35
Na_2O	0.05
K_2O	1.64
SrO	0.01
BaO	-
Loss on fusion (LOF)	0.05
Volatile trace element analysis µg/g (ppm)	
Hg	0.04
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CROWS NEST RESOURCES LIMITED
Line Creek Mine; #8 Seam; Elk Valley Coalfield
Sparwood, British Columbia

Sampling date		22-9-82
Sampling location		Mine (Surface)
Product name		Mine Run
Screen opening, mm (Screen opening, in)		
ERL number		4405-82
Rank of coal		Low-volatile bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	3.74		
Ash	%	21.71	22.55	
Volatile	%	17.31	17.98	23.21
Fixed carbon	%	57.24	59.47	76.79
Ultimate:				
Carbon	%	64.93	67.45	87.09
Hydrogen	%	3.47	3.60	4.65
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.22	0.23	-
Nitrogen	%	1.09	1.13	1.46
Ash	%	21.71	22.55	-
Oxygen, by difference	%	4.84	5.04	6.51
Heating value:				
	MJ/kg	25.88	26.89	34.72
	kcal/kg	6182	6422	8292
	Btu/lb	11,128	11,560	14,926

Hardgrove grindability index		70
Free swelling index (FSI) ..		NA
Moisture (as rec'd)		
Inherent	%	0.83
Adherent	%	2.91

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1482+	
Spherical	°C	1482+	
Hemispherical	°C	1482+	
Fluid	°C	1482+	

Notes: Crows Nest Resources Ltd. is a subsidiary of Shell Canada Resources

CROWS NEST RESOURCES LIMITED
Line Creek Mine; #8 Seam; Elk Valley Coalfield
Sparwood, British Columbia

Sampling date	22-9-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4405-82
Ash analysis, %:	
SiO_2	61.96
Al_2O_3	30.37
Fe_2O_3	1.66
Mn_3O_4	-
TiO_2	1.41
P_2O_5	0.30
CaO	0.66
MgO	0.32
SO_3	0.38
Na_2O	0.04
K_2O	1.50
SrO	0.02
BaO	-
Loss on fusion (LOF)	0.34
Volatile trace element analysis µg/g (ppm)	
Hg	0.06
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

CROWS NEST RESOURCES LIMITED
Line Creek Mine; #9 Seam; Elk Valley Coalfield
Sparwood, British Columbia

Sampling date		22-9-82
Sampling location		Mine (Surface)
Product name		Mine Run
Screen opening, mm		
(Screen opening, in)		
ERL number		4403-82
Rank of coal		Low-volatile bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.94		
Ash	%	21.85	22.28	
Volatile	%	17.57	17.92	23.06
Fixed carbon	%	58.64	59.80	76.94
Ultimate:				
Carbon	%	68.35	69.70	89.68
Hydrogen	%	3.71	3.78	4.86
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.30	0.31	-
Nitrogen	%	1.81	1.85	2.38
Ash	%	21.85	22.28	-
Oxygen, by difference	%	2.04	2.08	2.68
Heating value:				
	MJ/kg	29.60	27.43	35.29
	kcal/kg	6425	6552	8430
	Btu/lb	11,565	11,794	15,175

Hardgrove grindability index		81
Free swelling index (FSI) ..		6
Moisture (as rec'd)		
Inherent	%	0.39
Adherent	%	1.55

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1482+	
Spherical	°C	1482+	
Hemispherical	°C	1482+	
Fluid	°C	1482+	

Notes: Crows Nest Resources Ltd. is a subsidiary of Shell Canada Resources

CROWS NEST RESOURCES LIMITED
Line Creek Mine; #9 Seam; Elk Valley Coalfield
Sparwood, British Columbia

Sampling date	22-9-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4403-82
Ash analysis, %:	
SiO_2	65.97
Al_2O_3	25.69
Fe_2O_3	1.28
Mn_3O_4	-
TiO_2	1.34
P_2O_5	0.26
CaO	0.46
MgO	0.22
SO_3	0.33
Na_2O	0.05
K_2O	2.09
SrO	0.03
BaO	-
Loss on fusion (LOF)	0.31
Volatile trace element analysis µg/g (ppm)	
Hg	0.03
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

FORDING COAL LIMITED
Fording River Mine; Elk Valley Coalfield
Elkford, British Columbia

Sampling date		23-9-82	
Sampling location		Preparation Plant	
Product name		Clean Metallurgical Coal	
Screen opening, mm (Screen opening, in)			
ERL number		4410-82	
Rank of coal		Medium-volatile bituminous	
Proximate analysis:		**As Rec'd**	**Dry**	**Dry Ash Free**
Moisture	%	11.73		
Ash	%	12.12	13.73	
Volatile	%	20.45	23.17	26.86
Fixed carbon	%	55.70	63.10	73.14
Ultimate:				
Carbon	%	65.76	74.50	86.36
Hydrogen	%	3.58	4.06	4.71
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.47	0.53	-
Nitrogen	%	1.35	1.53	1.77
Ash	%	12.12	13.73	-
Oxygen, by difference	%	4.99	5.65	6.55
Heating value:				
	MJ/kg	26.30	29.80	34.54
	kcal/kg	6282	7117	8250
	Btu/lb	11,308	12,810	14,849
Hardgrove grindability index		86		
Free swelling index (FSI)		2 1/2		
Moisture (as rec'd)				
Inherent	%	1.16		
Adherent	%	10.57		
Ash fusibility temperature:		**Reducing**		**Oxidizing**
Initial	°C	1282		
Spherical	°C	1418		
Hemispherical	°C	1454		
Fluid	°C	1477		

Notes:

FORDING COAL LIMITED
Fording River Mine; Elk Valley Coalfield
Elkford, British Columbia

Sampling date	23-9-82
Sampling location	Preparation Plant
Product name	Clean Metallurgical Coal
Screen opening, mm (Screen opening, in)	
ERL number	4410-82
Ash analysis, %:	
SiO_2	60.02
Al_2O_3	23.42
Fe_2O_3	3.16
Mn_3O_4	-
TiO_2	1.40
P_2O_5	0.69
CaO	4.82
MgO	0.70
SO_3	3.51
Na_2O	0.05
K_2O	1.45
SrO	0.01
BaO	-
Loss on fusion (LOF)	0.52
Volatile trace element analysis µg/g (ppm)	
Hg	0.03
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

FORDING COAL LIMITED
Fording River Mine; Tailings Pond; Elk Valley Coalfield
Elkford, British Columbia

Sampling date		23-9-82	
Sampling location		Tailings Pond	
Product name		Thermal Coal Feed	
Screen opening, mm			
(Screen opening, in)			
ERL number		4411-82	
Rank of coal		Medium-volatile bituminous	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	5.09		
Ash	%	26.12	27.52	
Volatile	%	18.46	19.45	26.83
Fixed carbon	%	50.33	53.03	73.17
Ultimate:				
Carbon	%	59.39	62.58	86.34
Hydrogen	%	3.29	3.47	4.79
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.36	0.38	-
Nitrogen	%	1.27	1.34	1.85
Ash	%	26.12	27.52	-
Oxygen, by difference	%	4.48	4.71	6.50
Heating value:				
	MJ/kg	24.08	25.37	35.00
	kcal/kg	5751	6059	8360
	Btu/lb	10,352	10,907	15,048
Hardgrove grindability index		154		
Free swelling index (FSI) ..		2 1/2		
Moisture (as rec'd)				
Inherent	%	0.95		
Adherent	%	4.14		
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1227		
Spherical	°C	1424		
Hemispherical	°C	1474		
Fluid	°C	1482+		

Notes:

FORDING COAL LIMITED
Fording River Mine; Tailings Pond; Elk Valley Coalfield
Elkford, British Columbia

Sampling date	23-9-82
Sampling location	Tailings Pond
Product name	Thermal Coal Feed
Screen opening, mm (Screen opening, in)	
ERL number	4411-82
Ash analysis, %:	
SiO_2	60.67
Al_2O_3	22.76
Fe_2O_3	8.72
Mn_3O_4	-
TiO_2	1.20
P_2O_5	0.37
CaO	1.82
MgO	0.49
SO_3	1.00
Na_2O	0.05
K_2O	1.80
SrO	0.03
BaO	-
Loss on fusion (LOF)	0.43
Volatile trace element analysis µg/g (ppm)	
Hg	0.04
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

FORDING COAL LIMITED
Fording River Mine; Eagle Mountain Side; #11 Seam; Elk Valley Coalfield
Elkford, British Columbia

Sampling date		23-9-82	
Sampling location		Mine (Surface)	
Product name		Mine Run	
Screen opening, mm			
(Screen opening, in)			
ERL number		4406-82	
Rank of coal		Medium-volatile bituminous	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	8.78		
Ash	%	5.26	5.77	
Volatile	%	26.76	29.34	31.14
Fixed carbon	%	59.20	64.89	68.86
Ultimate:				
Carbon	%	69.53	76.22	80.89
Hydrogen	%	4.00	4.39	4.66
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.77	0.84	-
Nitrogen	%	1.75	1.92	2.04
Ash	%	5.26	5.77	-
Oxygen, by difference	%	9.91	10.86	11.52
Heating value:				
	MJ/kg	27.72	30.39	32.25
	kcal/kg	6621	7258	7702
	Btu/lb	11,918	13,065	13,865
Hardgrove grindability index		87		
Free swelling index (FSI) ..		NA		
Moisture (as rec'd)				
Inherent	%	5.36		
Adherent	%	3.42		
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1268		
Spherical	°C	1318		
Hemispherical	°C	1371		
Fluid	°C	1429		

Notes:

FORDING COAL LIMITED
Fording River Mine; Eagle Mountain Side; #11 Seam; Elk Valley Coalfield
Elkford, British Columbia

Sampling date	23-9-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4406-82
Ash analysis, %:	
SiO_2	49.18
Al_2O_3	21.05
Fe_2O_3	1.56
Mn_3O_4	-
TiO_2	1.22
P_2O_5	0.70
CaO	9.16
MgO	1.29
SO_3	12.19
Na_2O	0.13
K_2O	1.93
SrO	0.13
BaO	-
Loss on fusion (LOF)	1.32
Volatile trace element analysis µg/g (ppm)	
Hg	0.02
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

FORDING COAL LIMITED
Fording River Mine; Eagle Mountain Side; #12 Seam; Elk Valley Coalfield
Elkford, British Columbia

Sampling date		23-9-82	
Sampling location		Mine (Surface)	
Product name		Mine Run	
Screen opening, mm			
(Screen opening, in)			
ERL number		4408-82	
Rank of coal		Medium-volatile bituminous	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	7.17		
Ash	%	42.86	46.17	
Volatile	%	15.41	16.60	30.84
Fixed carbon	%	34.56	37.23	69.16
Ultimate:				
Carbon	%	41.62	44.83	83.28
Hydrogen	%	2.43	2.62	4.87
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.57	0.61	-
Nitrogen	%	1.05	1.13	2.10
Ash	%	42.86	46.17	-
Oxygen, by difference	%	4.30	4.64	8.62
Heating value:				
	MJ/kg	16.54	17.82	33.10
	kcal/kg	3951	4256	7906
	Btu/lb	7712	7661	14,232
Hardgrove grindability index		76		
Free swelling index (FSI) ..		NA		
Moisture (as rec'd)				
Inherent	%	1.91		
Adherent	%	5.26		
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1321		
Spherical	°C	1471		
Hemispherical	°C	1482+		
Fluid	°C	1482+		

Notes:

FORDING COAL LIMITED
Fording River Mine; Eagle Mountain Side; #12 Seam; Elk Valley Coalfield
Elkford, British Columbia

Sampling date	23-9-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4408-82
Ash analysis, %:	
SiO_2	68.75
Al_2O_3	18.47
Fe_2O_3	3.47
Mn_3O_4	-
TiO_2	0.87
P_2O_5	0.40
CaO	1.41
MgO	0.68
SO_3	1.13
Na_2O	0.04
K_2O	3.17
SrO	0.03
BaO	-
Loss on fusion (LOF)	0.47
Volatile trace element analysis µg/g (ppm)	
Hg	0.06
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

FORDING COAL LIMITED
Fording River Mine; Greenhills Side; "B" Seam; Elk Valley Coalfield
Elkford, British Columbia

Sampling date		23-9-82	
Sampling location		Mine (Surface)	
Product name		Mine Run	
Screen opening, mm			
(Screen opening, in)			
ERL number		4407-82	
Rank of coal		Medium-volatile bituminous	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	1.58		
Ash	%	17.83	18.12	
Volatile	%	17.39	17.67	21.58
Fixed carbon	%	63.20	64.21	78.42
Ultimate:				
Carbon	%	71.83	72.98	89.13
Hydrogen	%	3.57	3.63	4.43
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.28	0.28	-
Nitrogen	%	1.27	1.29	1.58
Ash	%	17.83	18.12	-
Oxygen, by difference	%	3.64	3.70	4.52
Heating value:				
	MJ/kg	28.57	29.03	35.45
	kcal/kg	6824	6934	8468
	Btu/lb	12,283	12,480	15,242
Hardgrove grindability index		79		
Free swelling index (FSI) ..		NA		
Moisture (as rec'd)				
Inherent	%	0.46		
Adherent	%	1.12		
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1246		
Spherical	°C	1377		
Hemispherical	°C	1429		
Fluid	°C	1460		

Notes:

FORDING COAL LIMITED
Fording River Mine; Greenhills Side; "B" Seam; Elk Valley Coalfield
Elkford, British Columbia

Sampling date	23-9-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4407-82
Ash analysis, %:	
SiO_2	60.43
Al_2O_3	20.95
Fe_2O_3	5.64
Mn_3O_4	-
TiO_2	0.92
P_2O_5	1.85
CaO	4.08
MgO	0.93
SO_3	1.89
Na_2O	0.02
K_2O	1.30
SrO	0.03
BaO	-
Loss on fusion (LOF)	0.52
Volatile trace element analysis µg/g (ppm)	
Hg	0.04
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

FORDING COAL LIMITED
Fording River Mine; Greenhills Side; "D" Seam; Elk Valley Coalfield
Elkford, British Columbia

Sampling date		23-9-82
Sampling location		Mine (Surface)
Product name		Mine Run
Screen opening, mm		
(Screen opening, in)		
ERL number		4409-82

Rank of coal ..... Medium-volatile bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	2.57		
Ash	%	53.90	55.32	
Volatile	%	11.99	12.31	27.55
Fixed carbon	%	31.54	32.37	72.45
Ultimate:				
Carbon	%	38.84	39.86	89.21
Hydrogen	%	2.15	2.21	4.95
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.19	0.20	-
Nitrogen	%	0.90	0.92	2.06
Ash	%	53.90	55.32	-
Oxygen, by difference	%	1.45	1.49	3.33
Heating value:				
	MJ/kg	14.59	14.98	33.53
	kcal/kg	3485	3577	8006
	Btu/lb	6273	6438	14,409

Hardgrove grindability index 67

Free swelling index (FSI) ..

Moisture (as rec'd)

Inherent	%	0.66
Adherent	%	1.91

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1427	
Spherical	°C	1482+	
Hemispherical	°C	1482+	
Fluid	°C	1482+	

Notes:

FORDING COAL LIMITED
Fording River Mine; Greenhills Side; "D" Seam; Elk Valley Coalfield
Elkford, British Columbia

Sampling date	23-9-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4409-82
Ash analysis, %:	
SiO_2	71.40
Al_2O_3	19.56
Fe_2O_3	1.91
Mn_3O_4	-
TiO_2	0.98
P_2O_5	0.10
CaO	0.49
MgO	0.95
SO_3	0.29
Na_2O	0.07
K_2O	2.85
SrO	0.02
BaO	-
Loss on fusion (LOF)	0.13
Volatile trace element analysis µg/g (ppm)	
Hg	0.06
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

B.C. COAL LIMITED
Greenhills Mine; Elk Valley Coalfield
Elkford, British Columbia

Sampling date	21-9-82
Sampling location	Greenhills Preparation Plant
Product name	Clean Metallurgical Coal
Screen opening, mm (Screen opening, in)	
ERL number	4400-82

Rank of coal ..... Medium-volatile bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	12.71		
Ash	%	12.72	14.57	
Volatile	%	24.10	27.61	32.32
Fixed carbon	%	50.47	57.82	67.68
Ultimate:				
Carbon	%	59.70	68.39	80.05
Hydrogen	%	3.39	3.88	4.54
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.36	0.41	-
Nitrogen	%	1.12	1.28	1.50
Ash	%	12.72	14.57	-
Oxygen, by difference	%	10.00	11.47	13.43
Heating value:				
	MJ/kg	23.96	27.45	32.13
	kcal/kg	5722	6555	7673
	Btu/lb	10,300	11,799	13,811

Hardgrove grindability index		81
Free swelling index (FSI) ..		NA
Moisture (as rec'd)		
Inherent	%	4.77
Adherent	%	7.94

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1341	
Spherical	°C	1482+	
Hemispherical	°C	1482+	
Fluid	°C	1482+	

Notes: B.C. Coal Ltd. is a subsidiary of British Columbia Resources Investment Corp.

B.C. COAL LIMITED
Greenhills Mine; Elk Valley Coalfield
Elkford, British Columbia

Sampling date	21-9-82
Sampling location	Greenhills Preparation Plant
Product name	Clean Metallurgical Coal
Screen opening, mm (Screen opening, in)	
ERL number	4400-82
Ash analysis, %:	
SiO_2	60.17
Al_2O_3	26.13
Fe_2O_3	2.42
Mn_3O_4	-
TiO_2	1.22
P_2O_5	0.42
CaO	3.20
MgO	0.77
SO_3	2.69
Na_2O	0.08
K_2O	1.80
SrO	0.09
BaO	-
Loss on fusion (LOF)	0.21
Volatile trace element analysis µg/g (ppm)	
Hg	0.02
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

B.C. COAL LIMITED.
Greenhills Mine; #1 Seam; Elk Valley Coalfield
Elkford, British Columbia

Sampling date		21-9-82	
Sampling location		Mine (Surface)	
Product name		Mine Run	
Screen opening, mm			
(Screen opening, in)			
ERL number		4398-82	
Rank of coal		Medium-volatile bituminous	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	3.82		
Ash	%	25.53	26.54	
Volatile	%	18.99	19.74	26.87
Fixed carbon	%	51.66	53.72	73.13
Ultimate:				
Carbon	%	63.75	66.28	90.23
Hydrogen	%	3.58	3.72	5.06
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.26	0.27	-
Nitrogen	%	1.54	1.60	2.18
Ash	%	25.53	26.54	-
Oxygen, by difference	%	1.52	1.59	2.16
Heating value:				
	MJ/kg	24.90	25.89	35.24
	kcal/kg	5947	6183	8417
	Btu/lb	10,705	11,130	15,151
Hardgrove grindability index		115		
Free swelling index (FSI) ..		7 1/2		
Moisture (as rec'd)				
Inherent	%	0.50		
Adherent	%	3.32		
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1249		
Spherical	°C	1313		
Hemispherical	°C	1446		
Fluid	°C	1457		

Notes: B.C. Coal Ltd. is a subsidiary of British Columbia Resources Investment Corp.

B.C. COAL LIMITED
Greenhills Mine; #1 Seam; Elk Valley Coalfield
Elkford, British Columbia

Sampling date	21-9-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4398-82
Ash analysis, %:	
SiO_2	62.57
Al_2O_3	20.08
Fe_2O_3	10.00
Mn_3O_4	-
TiO_2	0.88
P_2O_5	0.04
CaO	0.70
MgO	1.36
SO_3	0.23
Na_2O	0.06
K_2O	2.03
SrO	0.01
BaO	-
Loss on fusion (LOF)	-
Volatile trace element analysis µg/g (ppm)	
Hg	0.05
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

B.C. COAL LIMITED
Greenhills Mine; #7 Seam; Elk Valley Coalfield
Elkford, British Columbia

Sampling date		21-9-82	
Sampling location		Mine (Surface)	
Product name		Mine Run	
Screen opening, mm (Screen opening, in)			
ERL number		4397-82	
Rank of coal		Medium-volatile bituminous	
Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	8.06		
Ash	%	12.63	13.74	
Volatile	%	21.41	23.29	27.00
Fixed carbon	%	57.90	62.97	73.00
Ultimate:				
Carbon	%	68.80	74.83	86.75
Hydrogen	%	3.91	4.25	4.93
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.39	0.42	-
Nitrogen	%	1.17	1.27	1.47
Ash	%	12.63	13.74	-
Oxygen, by difference	%	5.04	5.49	6.36
Heating value:				
	MJ/kg	27.61	30.03	34.81
	kcal/kg	6594	7172	8314
	Btu/lb	11,869	12,910	14,966
Hardgrove grindability index		121		
Free swelling index (FSI) ..		6		
Moisture (as rec'd)				
Inherent	%	0.79		
Adherent	%	7.27		
Ash fusibility temperature:		Reducing		Oxidizing
Initial	°C	1482+		
Spherical	°C	1482+		
Hemispherical	°C	1482+		
Fluid	°C	1482+		

Notes: B.C. Coal Ltd. is a subsidiary of British Columbia Resources Investment Corp.

B.C. COAL LIMITED
Greenhills Mine; #7 Seam; Elk Valley Coalfield
Elkford, British Columbia

Sampling date	21-9-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4397-82
Ash analysis, %:	
SiO_2	56.60
Al_2O_3	37.85
Fe_2O_3	0.67
Mn_3O_4	-
TiO_2	2.32
P_2O_5	0.05
CaO	0.75
MgO	0.09
SO_3	0.63
Na_2O	0.02
K_2O	0.28
SrO	0.01
BaO	-
Loss on fusion (LOF)	2.02
Volatile trace element analysis µg/g (ppm)	
Hg	0.02
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

B.C. COAL LIMITED
Greenhills Mine; #10 Seam; Elk Valley Coalfield
Elkford, British Columbia

Sampling date	21-9-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4399-82

Rank of coal ..... Medium-volatile bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Equilibrium moisture	%	8.68		
Ash	%	48.86	53.50	
Volatile	%	16.98	18.59	39.98
Fixed carbon	%	25.48	27.91	60.02
Ultimate:				
Carbon	%	33.16	36.32	78.11
Hydrogen	%	1.91	2.09	4.49
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.21	0.23	-
Nitrogen	%	1.20	1.31	2.82
Ash	%	48.86	53.50	-
Oxygen, by difference	%	5.98	6.55	14.09
Heating value:				
	MJ/kg	11.56	12.66	27.23
	kcal/kg	2761	3023	6501
	Btu/lb	4970	5442	11,703

Hardgrove grindability index	78	
Free swelling index (FSI) ..	NA	
Moisture (as rec'd)		
Inherent ..... %		
Adherent ..... %		

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1363	
Spherical	°C	1482+	
Hemispherical	°C	1482+	
Fluid	°C	1482+	

Notes: B.C. Coal Ltd. is a subsidiary of British Columbia Resources Investment Corp.

B.C. COAL LIMITED
Greenhills Mine; #10 Seam; Elk Valley Coalfield
Elkford, British Columbia

Sampling date	21-9-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4399-82
Ash analysis, %:	
SiO_2	69.94
Al_2O_3	20.02
Fe_2O_3	2.36
Mn_3O_4	-
TiO_2	0.97
P_2O_5	0.11
CaO	0.88
MgO	0.50
SO_3	0.69
Na_2O	0.09
K_2O	3.27
SrO	0.02
BaO	-
Loss on fusion (LOF)	0.02
Volatile trace element analysis µg/g (ppm)	
Hg	0.07
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

B.C. COAL LIMITED
Greenhills Mine; #16 Seam; Elk Valley Coalfield
Elkford, British Columbia

Sampling date		21-9-82
Sampling location		Mine (Surface)
Product name		Mine Run
Screen opening, mm (Screen opening, in)		
ERL number		4396-82

Rank of coal ..... Medium-volatile bituminous

Proximate analysis:		As Rec'd	Dry	Dry Ash Free
Moisture	%	7.25		
Ash	%	5.93	6.39	
Volatile	%	23.45	25.28	27.01
Fixed carbon	%	63.37	68.33	72.99
Ultimate:				
Carbon	%	75.79	81.71	87.29
Hydrogen	%	4.31	4.65	4.97
Sulphur (Pyritic)	%			
(Sulphate)	%			
(Organic)	%			
Total	%	0.56	0.60	-
Nitrogen	%	1.54	1.66	1.77
Ash	%	5.93	6.39	-
Oxygen, by difference	%	4.62	4.99	5.33
Heating value:				
	MJ/kg	30.74	33.14	35.40
	kcal/kg	7341	7915	8455
	Btu/lb	13,214	14,247	15,220

Hardgrove grindability index		68
Free swelling index (FSI) ..		7 1/2
Moisture (as rec'd)		
Inherent	%	0.86
Adherent	%	6.39

Ash fusibility temperature:		Reducing	Oxidizing
Initial	°C	1229	
Spherical	°C	1241	
Hemispherical	°C	1268	
Fluid	°C	1357	

Notes: B.C. Coal Ltd. is a subsidiary of British Columbia Resources Investment Corp.

B.C. COAL LIMITED
Greenhills Mine; #16 Seam; Elk Valley Coalfield
Elkford, British Columbia

Sampling date	21-9-82
Sampling location	Mine (Surface)
Product name	Mine Run
Screen opening, mm (Screen opening, in)	
ERL number	4396-82
Ash analysis, %:	
SiO_2	38.36
Al_2O_3	24.56
Fe_2O_3	11.20
Mn_3O_4	-
TiO_2	1.01
P_2O_5	9.22
CaO	11.54
MgO	0.20
SO_3	1.73
Na_2O	0.05
K_2O	0.17
SrO	0.38
BaO	0.62
Loss on fusion (LOF)	0.46
Volatile trace element analysis µg/g (ppm)	
Hg	0.03
Cl	
F	
Br	
As	
Se	
Non-volatile trace element analysis µg/g (ppm)	
Ba	
Sr	
V	
Mn	
Cr	

Notes:

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Table 1 - Summary classification of coal by rank

VM* %	FC* %	Class	Group(rank)	Calorific value** Btu/lb	Calorific value** MJ/kg
2	98 -	Anthracitic(1)	Meta - Anthracite		
8	92 -		Anthracite		
14	86		Semianthracite		
22	78 -	Bituminous(2)	Low-volatile bituminous		
31	69 -		Medium-volatile bituminous		
			High-volatile A bituminous	14 000	32.6
			High-volatile B bituminous	13 000	30.2
			High-volatile C bituminous	11 500	26.7
		Subbituminous(4)	Subbituminous A(3)	10 500	24.4
			Subbituminous B	9 500	22.1
			Subbituminous C	8 300	19.3
		Lignite(4)	Lignite A	6 300	14.7
			Lignite B		

* Dry, mineral-matter-free basis; VM = Volatile matter; FC = Fixed carbon.

** Moist, mineral-matter-free basis.

(1) Nonagglomerating; if agglomerating, classified as low-volatile bituminous.

(2) Commonly agglomerating.

(3) If agglomerating, classified as high-volatile C bituminous.

(4) Nonagglomerating.

Table 2 - Some of the mines sampled and their approximate raw coal production for 1982
(In thousands of tonnes)

	($\times 10^3$ tonnes)
NOVA SCOTIA	
Inverness Coalfield	
St. Rose Mine (Evans Coal Mines Ltd.)	49
Pictou Coalfield	
Drummond Colliery (Drummond Coal Co. Ltd.)	12
Sydney Coalfield	
Lingan Mine (Cape Breton Development Corp.)	1804
No. 26 Colliery (CBDC)	914
Prince Mine (CBDC)	498
Point Aconi Pit (NOVACO)	242
NEW BRUNSWICK	
Minto Coalfield	
Minto/Chipman Area Pits (N.B. Coal Ltd.)	498
SASKATCHEWAN	
Estevan Coalfield	
Bienfait Mine (Bienfait Coal Co. Ltd.)	1428
Boundary Dam Mine (M & S Coal Co. Ltd.)	1133
Costello Mine (formerly Klimax Mine, Manalta Coal Ltd.)	556
Souris Valley Mine (Sask. Power Corp.)	274
Utility Mine (Sask. Power Corp., with Manalta as operator)	2197
Willow Bunch Coalfield	
Poplar River Mine (Sask. Power Corp.)	1905

Table 2 cont'd

	($\times 10^3$ tonnes)
ALBERTA PLAINS REGION	
Battle River Coalfield	
Diplomat Mine (Forestburg Collieries Ltd.)	367
Paintearth Mine (Forestburg Collieries Ltd.)	1220
Vesta Mine (Alberta Power Ltd., with Manalta as operator)	899
Sheerness Coalfield	
Montgomery Mine (formerly Roselyn Mine, Manalta Coal Ltd.)	33
Wabamun Coalfield	
Highvale Mine (TransAlta Utilities Ltd. with Manalta as operator)	8550
Whitewood Mine (TransAlta Utilities Ltd. with Manalta as operator)	1893
ALBERTA FOOTHILLS REGION	
Coalspur Coalfield	
Coal Valley Mine (Luscar Sterco Ltd.)	5276
ALBERTA MOUNTAIN REGION	
Cadomin-Luscar Coalfield	
Luscar Mine (Cardinal River Coals Ltd.)	2766
Smoky River Coalfield	
Mine No. 1774 (surface mines, Smoky River Coals Ltd.)	960
Mine No. 1765 (underground mines, Smoky River Coals Ltd.)	866

Table 2 cont'd

	($\times 10^3$ tonnes)
BRITISH COLUMBIA	
Crowsnest Coalfield	
Corbin Mine (Byron Creek Collieries)	1225
Harmer Surface Mine (B.C. Coal Ltd.)	6438
Michel Underground Mine (B.C. Coal Ltd.)	1076
Elk Valley Coalfield	
Fording River Mine (Fording Coal Ltd.)	6369
Line Creek Mine (Crows Nest Resources Ltd.)	1466
Greenhills Mine (B.C. Coal Ltd.)	708

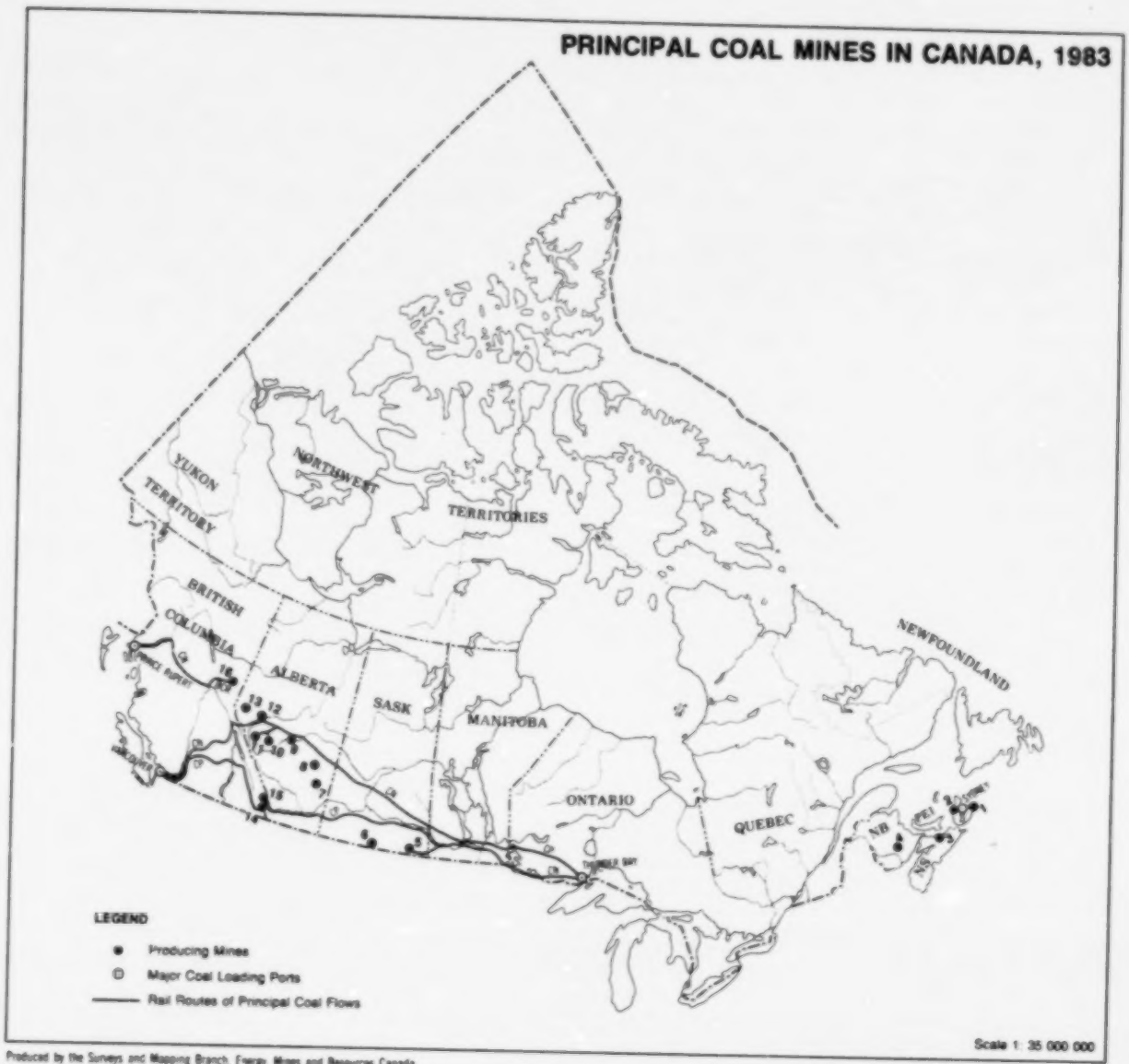

FIGURE 1

INDEX FOR MAP

Nova Scotia
(bituminous coal)

1. Lingan Mine (Cape Breton Development Corporation
   No. 26 Colliery (Cape Breton Development Corporation)
   Prince Mine (Cape Breton Development Corporation)
   Point Aconi Pit (Novaco Ltd.)
2. St. Rose Mine (Evans Coal Mines Ltd.)
3. Drummond Mine (Drummond Coal Co.)

New Brunswick
(bituminous coal)

4. Minto / Chipman Area Pits (N. B. Coal Ltd.)

Saskatchewan
(lignitic coal)

5. Bienfait Mine (Bienfait Coal Co.)
   Boundary Dam Mine (M & S Coal Co.)
   Costello Mine (formerly Klimax Mine) (Manalta Coal Ltd.)
   Souris Valley Mine (Saskatchewan Power Corporation)
   Utility Mine (Saskatchewan Power Corporation, with Manalta as operator)
6. Poplar River Mine (Saskatchewan Power Corporation)

Alberta
(subbituminous coal)

7. Montgomery Mine (formerly Roselyn Mine) (Manalta Coal Ltd.)
8. Vesta Mine (Alberta Power Limited, with Manalta as operator)
   Diplomat Mine (Forestburg Collieries Ltd.)
   Paintearth Mine (Forestburg Collieries Ltd.)
9. Highvale Mine (TransAlta Utilities Corporation, with Manalta as operator
   Whitewood Mine (TransAlta Utilities Corporation, with Manalta as operator)

(bituminous coal)

10. Coal Valley Mine (Luscar Sterco Ltd.)
11. Luscar Mine (Cardinal River Coals Ltd.)
    Gregg River Mine (Manalta Coal Ltd.)
12. Obed-Marsh Project (Union Oil Company of Canada Limited)
13. No. 1785 Mine (underground) (Smoky River Coals Ltd.)
    No. 1774 Mine (surface) (Smoky River Coals Ltd.)

British Columbia
(bituminous coal)

14. Corbin Mine (Byron Creek Collieries Limited)
    Harmer Surface Mine (Westar Mining Ltd.)
    Michel Underground Mine (Westar Mining Ltd.)
15. Line Creek Mine (Crows Nest Resources Limited)
    Fording River Mine (Fording Coal Ltd.)
    Greenhills Mine (Westar Mining Ltd.)
16. Quintette Mine (Denison Mines Limited and others)
    Bullmoose Mine (Teck Corporation and others)

OPINION POLL

The opinion of concerned readers may influence the direction of future CANMET research.

We invite your assessment of this report - No._____

Is it useful? Yes_____ No_____

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Comments_____

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